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PROCEEDINGS OF THE FLORIDA PUBLIC MEETING, HELD AT ORLANDO, FLORIDA, ON MARCH 12, 1968. VOLUME 2

Charles C. Sweglar

Federal Water Pollution Control Administration
Atlanta, Georgia

1968

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CLEAN WATER

....FOR THE NATION'S ESTUARIES

PROCEEDINGS OF THE
FLORIDA PUBLIC MEETING
ORLANDO, FLORIDA
MARCH 12, 1968

VOLUME 2 of 3

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SUBMITTAL OF THE ORLANDO AREA CHAMBER OF COMMERCE
at the Public Meeting on the
National Estuarine Pollution Study
March 12, 1968, Orlando, Florida

Prepared by: *Charles C. Sweglar, Chairman
Water Resources Committee
Orlando Area Chamber of Commerce

*Chairman: Industrial Wastes Committee
Florida Pollution Control Association
and Member of Executive Board

Chairman: Pollution Control Committee, Chapter 69
American Institute of Plant Engineers

Members: W.P.C.F.
A.P.C.A.
A.E.S.
A.I.H.A.
A.I.P.E.
U.S.U.I.

INTRODUCTION:

The greater Orlando area is one of the major consumer centers for the seafood and shellfish, which are products of our state estuarine waters.

The greater Orlando area is a population center which is a major user of these same waters for socialogically necessary recreational purposes.

Our interest in the problem of estuarine pollution extends, however, beyond these simply stated tho important facts. We are concerned, as citizens, with the continuation of those vested rights which all people in our land have in the enjoyment and beneficial use of the public domain. Rights so settled, that they should not be subject to defeat thru the abrogation by prescription or user, of present constitutional guarantees thru law.

The public rights to the enjoyment and usage of estuarine waters are such that our local, state and federal governments must recognize them in justice and equity as being lawful in themselves and settled according to our present rule of law, and must protect these rights so that no individual shall be aibitrarily deprived, without injustice, of the privileges devolving from such rights. It has been said that a right is not "vested" unless it is more than a mere expectation based upon the anticipated continuation of present laws; it must be an established interest in property, and not open to doubt.

We can only surmise, at this point in time, as to what our real expectations may be. Is the question open to doubt? It seems that it may well be open to doubt, if we are to believe the evidence which assails our physical senses ... we, each of us, see, feel, smell, taste the evidence on a subjective level which is purely personal. We gravitate to the objective point of view only after we realize that as a community in the vicinity of an estuarine headwater, we contribute directly and measurably, to the influences acting on the quality of the waters in the estuary proper...as does every community from here to the sea. The problem becomes more capable of definition then...we see parallels in the Delaware Estuary and the Chesapeake Bay, the Tennessee River, the Ohio River, and the Potomac River basin. I do not think that we are so callous to the duties which attach to rights and privileges, that we can wait any longer. The immutable laws of nature have taught us the lessons of cause and effect.

PROBLEM:

1. Potential and actual pollution of estuarine waters, including tributary waters flowing to the sea, alluvial areas at the sea, and the cumulative pollution of the Florida-Atlantic coastal shelf area.

2. Lack of information concerning viral latency and its association with malignancy and other diseases, as regards water transmission as a major epidemiological factor (See Lukin).

3. Concern, however unqualified, for the cumulative effects of the present continuing pollution of such waters, due to:

    3.1 Effluent from domestic and commerical activities.
    3.2 Effluent from primary sewage treatment plants.
    3.3 Effluent from septic tanks.
    3.4 Uncontrolled pollution from private pleasure water craft.

4. Lack of information regarding the ocean floor and the effects of pollutants upon its ecosystems.

5. Lack of knowledge of the parameters necessary to an estimation of maximum safe volumes of sewage and other pollutants which can be discharged, in unit time, into estuarine waters, i.e., (see Lukin) dispersion and die-away of coliform organisms, characteristics of sewage and industrial outfall boils, plumes of communited domestic materials, die-away pattern in excretable virus in ecological systems at outfall points, virus transmission and survival patterns in general.

6. Ecology of edible marine flora and fauna in polluted ecosystems.

7. Identification of specific sources of hydropols (water pollutants):

    7.1 Hydropols inherent to water systems.
    7.2 Hydropols originating as terrapols (soil pollutants).
    7.3 Hydropols originating as aeropols (air pollutants).

GENERAL FACTS:

1. Seafood and shellfish populations are diminished by pollution.

2. Surviving populations are not suitable for consumption when infected by pollutants in many cases.

3. Gross pollution of the estuarine watercourses does exist, due to the relatively uncontrolled discharge of hydropols from inadequate municipal sewage treatment plants.

4. Florida does not have adequate pleasure craft oriented pollution control legislation to abate the discharge of raw sewage into estuarine waters (2 states lack such legislation, Florida and Alabama!).

5. Many municipal and industrial waste treatment facilities are operated by unqualified personal.

6. Land use and zoning laws fail to protect either the private land owner or the commonwealth from the adverse effects of undisciplined land and water use on the supply of the natural resources...whenever riparian, appropriative, or prescriptive water rights are exercised to the detriment of the natural resource.

7. Trained investigators are in short supply.

SUMMARY & RECOMMENDATIONS:

A systems approach is, obviously, necessary to establish the disciplines and methodology essential to meaningful corrective action.

Thus we must consider every facet of the problem and resolve the total into its component elements and treat each component on the basis of its relationship to the whole.

This means the identification and characterization of every residual, randon, dependent, and independent variable involved, and the further determination that these specifics are either measurable or immeasurable, within the capabilities of present technology.

We now know of, and can isolate, most of these specifics and can establish their sources by place and point in time anywhere upstream from a coastal estuary.

Thus we, the nation, must launch a two pronged attack as part of the selected stratery.

This attack must be:

1 Investigation
2 Concurrent corrective action, coupled with a more serious tact in public education.

1. INVESTIGATION

   1.1 Determine the status quo - the magnitude of the problem.

   1.2 Determine which changes must be made and the sequence and magnitude of changes.

2. INITIAL CORRECTIVE ACTION - applied to abvious conditions and concurrently with the investigation:

   2.1 Model boating laws - mandatory sanitary facilities as "closed" systems.

   2.2 Estuarine water quality and flow measurement at every sewage treatment plant outfall in the estuarine system... and rigid enforcement of standards at the local and state level.

   2.3 More efficient control of land use, where such use is adverse to the water quality.

3. DATA ANALYSIS:

3.1 Establish mathmatical models to define specific parameters and allow variables measurements within the assigned parameters.

4. RESEARCH:

4.1 Application of the "best methods" developed in other "estuary studies".

4.2 Design and test water oxygenators which would be operated by the thermal effects of the sun - such as Dr. Phillip Oppenheimer's water pump for desert irrigation.

No power required
Minimum capital investment
Lowest possible maintenance costs

4.3 Biological studies of ecosystems and sub-systems.

4.4 Epidemiological studies of excretable virus and waterborn transmission.

5. OVERALL ACTION:

5.1 A "hardnosed" approach to public education. A material society thinks in material terms, not in terms of morality. We tend, in general to dwell on our "rights" but give too little regard to our obligations.

Assurance that we won't be "punched in the mouth" requires that we refrain from punching others. We are the polluters.

March 5, 1968

Mrs. Lamar F. Cox
The Tampa Audubon Society
3317 East Sevilla Circle
Tampa, Florida 33609

Dear Mrs. Cox:

We have your letter of February 19 regarding water pollution problems in the State of Florida. We are very much interested in your letter, and, if you have no objections, we will include it in the official transcript of our National Estuarine Pollution Study meeting in Orlando.

This Agency is presently conducting an intensive study of Hillsborough Bay, in and around Tampa, at the request of the State of Florida. We have had a team of engineers, chemists, and biologists located in a floating laboratory at Hooker's Point since the beginning of last year, and they will continue their study for the remainder of this year. I would suggest that you visit with them to obtain further information about the problems in the Tampa-Hillsborough Bay area. The Technical Director of this project is Mr. John Hagan and his telephone number in Tampa is 248-5704.

Again, we appreciate your interest and that of the Tampa Audubon Society, and hope that you will be able to attend our Orlando meeting.

Sincerely yours,

Paul J. Traina, Director
Technical Programs

cc: Mrs. Dorothy Teschner
Mr. John Hagan

PJTraina:ma/3/5/68

THE TAMPA AUDUBON SOCIETY

Tampa, Florida
February 19, 1968

President-Mrs. Dorothy Teschner
11334 North Rome Ave.
Telephone 935-5109

3317 East Sevilla Circle
Tampa, Florida 33609
February 19, 1968

Dear Sir:

Prior to the meeting on March 12 and 13 in Orlando of the Department of the Interior, Mrs. Dorothy Teschner, President of TAS, suggested I write you concerning water pollution problems in Florida. There are many reasons to believe federal aid might be needed because persons of responsibility are not assuming it.

I will mention a few of the local and state difficulties that have come to my attention.

I am enclosing a form letter addressed to constituents of this county be a local representative who introduced a severance tax. The pollution problem was touched on. It seems the bill did not reach the floor of the legislature yet and may not soon. No effective pollution control is in evidence because of the attitude of lawmakers of the state.

The same seems true in Hillsborough County. County commissioners named a three member panel to rule on air and water pollution here. The first man of the panel is vacating a post as chairman of the board of the southeastern distinct of the Borden Co. which operates phosphate facilities in Hillsborough and Manatee counties. He is to serve three years. The second is a lawyer and minister. The third is inspector for a steel company. None of them seems capable of this service since two would seem definitely biased in favor of industry and the other has no education to fit him for judging pollution. A director of the panel, Don Rogers, would seem to have a panel of helpers (always subject to the authority of county commissioners on rulings made) who are biased or relatively ignorant of pollution problems. The problems will spread throughout the state rapidly. Only last week two to three million dollars worth of land was purchased by prosphate companies in Manatee county. Prior to that one individual sold eight million dollars worth of land to phosphate companies in and around Arcadia.

Alafin river in particular in Hillsborough County is highly polluted. Four phospate companies are on the Alafin River:

I. U. S. Phosphoric Chemical Co. Gibsonton (at the mouth of the Alafia)
II. American Agricultural Chemical Co. Pierce in Polk Co.
III. International Mineral and Chemical Co. Mulberry.
IV. Swift and Co. (meat packers fertilizer plant) Agncola (address is Barton, Florida)

Hillsborough Bay is highly polluted. Long time residents are aware of this because they can remember when the water around Davis Island was clean enough to swim in. Too, air pollution is terrific. What does account for the terrific odors along Bayshore Blvd. in Tampa?

The citrus groves have been affected in numerous ways. The phosphate industry has drawn so much water that the water table has dropped terribly in some areas. Cattlemen and agriculture crops have suffered. Cattle get soft teeth from grazing land polluted by fumes from phosphate plants.

Please use federal laws to enforce control since local and state officials seem unable or incapable of doing so.

Yours truly,

Mrs. Lamar F. Cox

Ralph D. Tublington
Speaker

James Lorenzo Walker
Speaker Pro Tempore

Allen Morris
Clerk

W. A. Ballentine
Sergeant at Arms

FLORIDA HOUSE OF REPRESENTATIVES

Tallahassee

Elvin L. Martinez
Representative, 63rd District
Hillsborough, Citrus, Hernando, Pasco Counties
P. O. Box 4311, 1717 North Howard Avenue
Tampa, Florida 33607

Committee:
Commerce
Elections
Judiciary B
Judiciary C
Public Health & Welfare

I have received your letter regarding the severance tax I have proposed.

I do heartily respect your opinion on this matter, although I do not agree with it.

Allow me to explain the bill I have introduced; this bill would impose a 5 per cent tax on the value of the mineral at the point of severance. This value, by the industry's own estimate, is approximately $1.50 a ton. This would yield the state about 7½ cents a ton for the industry's priviledge of removing this mineral from the soil and is not a charge on any of the increased value for processing.

Under the "Murphy Act" the state reserves all, or in many instances ½, of the mineral rights to all property affected by the Murphy Act. This act does not include the Phosphate owned lands.

These companies enjoy tremendous rate advantages from the utility companies in our area and these advantages are given at the expense of the home subscriber to the utility company.

We are not allowed to tax the income of the corporations nor are they required to do any reclamation of the lands. They have also enjoyed a tax exemption on industrial equipment of over $5,000.00 in value.

During the last session when the Air and Water Pollution Control legislation was finally passed (over the industry's objection) it contained a further tax advantage in the industry's favor, this advantage being the exemption from Ad Valorem taxation any land or equipment used primarily for Air or Water Pollution control. As I understand this provision allows them to exempt most of the property which emits smoke or stores the residue from the processing.

Time does not permit me to furnish further reasons why I believe the proposed tax is fair but as you can see I am convinced that the taxpayers have done more than their share to subsidize this industry.

I hope that you can see my position in this regard.

Yours truly,

Elvin L. Martinez

ELM:GTG

MEMORANDUM

TO: Hon. C. S. "Cliff" Reuter
Senator, 30th District
P. O. Box 162
Sharpes, Florida 32959

FROM: Phillip E. Searcy, P. E., Dir.
Environmental Health Division
Brevard County Health Department

DATE: March 4, 1968

SUBJECT: Comments Concerning Estuarine Pollution, Brevard County, Florida, March, 1968

INTRODUCTION

Title 2, Section 5 (Q) (1), Clean Water Restoration Act of 1966 requires that the Federal Water Pollution Control Administration, U. S. Department of the Interior, complete a national estuarine study to be submitted to Congress by November 1, 1969. In an effort to obtain statements regarding local estuarine pollution problems, the Federal Water Pollution Control Administration has set a public meeting for March 12 and 13, 1968, in Orlando, Florida. The purpose of this memo is to review the interests of the Brevard County Health Department in estuarine pollution and to outline problem areas for further consideration and study. As you know, this department is a field agent for the Florida State Board of Health.

First, it is the position of this department that the state of Florida's programs for water pollution control, in cooperation with existing local programs provide an adequate capability for the study and control of estuarine pollution problems concerning the waterways of the state of Florida. The state should take the leadership in the pending study and play the major role in meeting the requests of the Congress. Activities of federal agencies should be minimum and should be used only to provide requested technical and financial assistance.

Second, this department has taken a firm position that any municipal or industrial waste waters must receive the highest degree of waste treatment now economically available prior to discharging such waste waters to the estuarine resources of our area; and, in some cases, it must be recognized that no waste water discharges can be permitted even where such high degrees of waste treatment are provided. The state of Florida has recently classified all its waters for best uses, which, in effect, sets up a zoning of these water resources.

Strict adherence to the established classification standards will require commensurate on-shore zoning plus significant improvement in technology related to waste water collection and treatment. The desired multiple uses of estuarine water resources in Brevard County has resulted in several different state and local agencies and institutions being interested in water quality studies. In order to provide the most effective approach to solving our water pollution problems, it will be necessary for a single local group to be charged with the responsibility of coordinating all such activities.

ESTUARINE CHARACTERISTICS

Estuarine waters important to Brevard County include the Atlantic Ocean, Port Canaveral, Sebastian Inlet, and the inland estuarine waters of the Indian River, Banana River, and tributaries. All of these waters are utilized for recreation and commercial fishing and certain large areas are set aside for the harvesting of shellfish including oysters and clams. Our beaches are widely known as beautiful, safe, clean ocean shores for public bathing; the Port of Canaveral is considered one of the few ports in the nation that is not grossly polluted and one which supports an excellent game fish population; Sebastian Inlet is widely known as one of the greatest fishing areas in the state of Florida; the waters of the Indian and Banana Rivers have brought this area the distinction of being named the salt water trout capital of the world; and, oysters taken from the waters of the Indian River in Brevard County and Indian River are second to none in size and quality. All of these beneficial water uses depend on a high standard of water quality, and it is, therefore, easy to see why this area must actively participate in water pollution control programs.

The Indian and Banana Rivers are actually shallow, salt water lagoons which experience very little lunar tide fluctuation. As a result, these waters receive little flushing action, or water exchange, and any waste discharges must be assimilated without the benefit of tidal dilution. It is also important to note that these water bodies have very few fresh water tributaries. In fact, the major fresh water discharges include contaminated storm water run-off from both urban and rural watershed areas. Such contamination has actually resulted in the closing of productive shellfish harvesting areas, and these areas are now placed in a "conditionally approved" category. This problem is particularly critical when realizing that shellfish in this area have a growth rate which greatly exceeds that of most other areas throughout the world.

Another critical characteristic of estuarine waters in Brevard County concerns high temperatures during summer months. It is not uncommon to record temperatures in excess of 90° F, even in deep canal systems. With increased temperatures, dissolved oxygen saturation is significantly reduced, thus reducing the ability of the receiving waters to assimilate organic waste discharges and support important fish life. Such conditions have resulted in increased incidents of fish kills in highly developed areas in recent years.

Wind tides are responsible for the major circulation and mixing of waters in the Indian and Banana Rivers. Existing road causeways and other land projections undoubtedly restrict the ability of these waters to assimilate large quantities of organic wastes by reducing circulation and mixing. Significant currents can be observed at bridge openings during and following strong wind activity especially when wind directions are either southerly or northerly.

WATER POLLUTION PROBLEMS

Major water pollution problems affecting the estuaries of Brevard County, Florida, include:

1) Discharges from sewage treatment plants;

2) Contaminated storm water run-off from urban and rural areas;

3) Waste discharges from watercraft;

4) Dredge and fill projects for land development.

Significant improvement has been made in Brevard County in recent years regarding the degree of waste treatment provided by sewage treatment plants and improved efficiency in operation and maintenance. All sewage treatment plants provide at least secondary treatment and many provide tertiary treatment. The primary concern of the Health Department at this time is with long-range, adverse effects of nutrients discharged in the highly treated effluents. Continued discharge of nutrients into the "salt water lagoons" can be expected to substantially increase the process of eutrophication in an area now receiving scores of complaints annually as a result of decaying aquatic vegetation in shallow cove areas. Efforts for a technological break-through resulting in the economical reduction of nitrates and phosphates in sewage treatment plant effluents must be stepped up and a solution must be found at an early date.

The adverse effects of storm water run-off from urban and rural areas cannot be expected to be completely eliminated. However, action by the Board of County Commissioners and municipalities to establish and extend central sewage collection and treatment services to outlying areas now served by hazardous individual septic tank systems, will enhance water quality by providing a controlled system for the collection and treatment of human wastes.

The possible harmful effects of storm water run-off from agricultural areas has not been adequately studied and should be given attention especially regarding residual pesticides reaching estuarine waters. Even low concentrations of pesticides can destroy shellfish production.

The problem of waste discharges from watercraft grows larger every day. This is a problem that cannot be solved on a local level and one which must receive the attention of state and federal government for a solution. The Indian River in Brevard County is part of the intracoastal waterway of the nation's eastern seaboard which, each year, carries thousands of vessels through the county. These vessels do not have adequate sewage holding or treatment facilities and untreated waste water, which is extremely hazardous in shellfish harvesting areas, is dumped into our estuarine waters.

Great concern has grown over the adverse effect of dredge and fill projects for land development in Brevard County. Efforts are now underway to prohibit any further dredge and fill operations without adequate investigation and study regarding conservation and water pollution control. Adverse effects can be both immediate and long range.

The effects of thermal pollution from cooling water discharges from the existing power plants located north of Cocoa have not been studied. Since such discharges could have a long-range adverse effect on water quality, especially during critical summer months, this problem should be carefully considered.

BREVARD COUNTY'S WATER POLLUTION CONTROL PROGRAM

A new, well-equipped laboratory facility, complete with water sampling equipment, and two boats, has enabled this department to carry on a large routine water quality monitoring program on all bodies of water including public bathing areas.

One full year of surface water quality monitoring in Brevard County has been completed. Samples were collected monthly from 105 stations located in the Indian River, Banana River, and St. Johns River basins to obtain basic physical, chemical, and bacteriological water quality data. Data is now being summarized to show present levels of water quality for the various stations and to determine possible correlation between quality parameters and physical features or characteristics of the water courses.

Brevard County Health Department, in cooperation with the Orange County Conservation Department, has initiated a water quality monitoring program for the upper St. Johns River basin, from S. R. 60 (Blue Cypress Lake) north to Interstate 4 (Lake Monroe). Purpose of the program is to obtain basic physical, chemical, biological, and bacteriological water quality data prior to and following construction of flood control features including impoundments. Approximately 40 sampling stations have been established and all work will be coordinated with Southern and Central Florida Flood Control District, Game and Fresh Water Fish Commission, Florida State Board of Health, Florida Air and Water Pollution Control Commission, and all other interested agencies. Sampling commenced in February, 1968.

A Water Quality Control Specialist, expert in the field of waste treatment, has been employed by the department. The duties of this specialist involve responsibility for inspection and surveillance of operation and maintenance of public water supply and waste water treatment facilities and operator training and assistance to improve efficiency of operations of treatment facilities.

EMIL R. SWEPSTON, M. D.

March 12, 1968

Mr. Chairman and Gentlemen:

I am Dr. Emil R. Swepston, of Englewood, Florida, Vice President of the VENICE-AREA Audubon Society, Secretary of the Sarasota Izaak Wlaton League of America and represent those organizations. I also speak for Mr. James E. Cook, President of the West Charlotte County Civic Association, who is unable to appear before you today. LEMON BAY on the west coast of Florida extends approximately 11 miles from Gasparilla Sound to Alligator Creek roughly half in each of the counties of Sarasota and Charlotte. It is traversed by the Intracoastal Waterway, making it navigable water throughout its entire length.

At the moment there are several condominium complexes under construction in the Lemon Bay area. Sarasota County has insisted on strict compliance with the existing classification of shellfish water and the developer of a large tract therin has altered his sewage disposal plans in conformity with those requirements. However, the Charlotte County Board of Commissioners has implied bastardizing the waters of the Bay by proposing a public hearing by the FAAWPCC on degrading so as to permit the discharge of partially treated effluent. They attempt to justify this by citing the reduction in the number of shellfish licensees over the past few years. They have not taken into account the hundreds of individuals, who harvest the shore lines and bars for their own use, or as gifts for their neighbors. Oysters, clams and scallops have been gathered in Lemon Bay for years by both permanent and tourist residents and changing the classification of the waters will not stop it. This, in may opinion as a physician, constitutes a real public health menace.

The organizations I represent agree with the closing paragraph in the Sarasota Herald Tribune editional attached, Quote "if the FAAWPCC does hold a hearing on the proposed downgrading of Lemon Bay, let us hope that what its members will hear on that occasion is a demand that the agency do what it was created to do - and control pollution, not authorize it." They know also that what Sarasota developers can do. Charlotte County developers can do likewise.

Thank you,

/s/ Emil R. Swepston, M. D.

The following resolution was unanimously adopted by the
VENICE-AREA AUDUBON SOCIETY at its
meeting, February 27, 1968

WHEREAS, state and federal governments have finally recognized the universal necessity of unpolluted air and water, be it

RESOLVED, that the Venice-Area Audubon Society commends the Sarasota County Health Department for its insistence on the strict compliance with the Florida State Board of Health Rules (Section 170C-508) regarding the waters of LEMON BAY, bordering on both Sarasota and Charlotte Counties. Furthermore the Society deplores the suggestion of any degrading of said waters by the Charlotte County Health Department as undesirable, unnecessary and contrary to the state and federal policies on "CLEAN WATER". Be it further resolved that copies of this resolution be forwarded to the Sarasota County Health Department, Charlotte County Health Department, Florida State Board of Health, Florida Board of Conservation, Florida Air and Water Pollution Commission and the Governor of the State.

/s/ Nan Norris Bergh
Secretary

Englewood, Florida,
February 29, 1968

JOHN L. McQUIGG
BULKHEAD SEMINAR
STUART, FLORIDA
May 21, 1965

THE ECONOMIC VALUE OF PRESERVING THE NATURAL SHORELINE

When I accepted the invitation to address this blue-ribbon group on "The Economic Value of Preserving the Natural Shoreline" I didn't realize the amount of work, reading, research and soul-searching that would be involved in preparing a paper that could make a sound contribution.

Strangely enough, very little information has been published bearing directly on the economic and production values of our estuarine and wetlands resources. That they are beyond question fantastically valuable to Florida will be indicated in the material I present, but we badly need further and detailed study in order adequately to appraise them.

It goes without need of proof that good fishing and Florida are synonymous. Our gigantic tourist business, our attraction for the affluent retired, our commercial fishing, the boating industry, residential building, even the attraction of clean industry are majorly affected by the maintenance of good fishing, and I'll present facts on those aspects later. But I think all of us can agree in principle -- whether we're sports fishermen or not -- that the sport of fishing is important to Florida.

The distinguished biologists and ecologists here with us these two days will prove -- I trust -- that you can't have good fishing and the destruction of vital estuarine bottomlands. Good bottomlands for spawning and nursery precede good fishing. You can't have one without the other. So somewhere along the line a decision has to be made -- hopefully before too much more is lost.

Now, I'm not against progress and development. No conservationist really is. We're not old fogeys, bird-watchers or old ladies in tennis shoes. But many of the things done under the name of progress are not really so. And much of the estuarine destruction and pollution can be avoided. Progress need not be despoilation, development can be guided, speculation can be channfled to protect maximum overall values. We know population growth will continue and must be housed. Florida will continue to attract people of all types. Incomes will rise and families will have more leisure time. Waterfront and associated sports will be desirable -- even essential to this growth. Indeed it is basic to my story that preparation for the sound growth of Florida carries with it the need and the obligation to protect our bottomlands or we will not make the satisfactory and high-quality growth to which our natural resources entitle us.

This is the cold fact: There are other ways than dredge-and-fill to develop property. There is no other way to provide spawning and nursery grounds ... and this should give everyone pause. Once mother nature's works have been despoiled and altered, that change is irrevocable. It can't be changed back. It's gone forever.

Biologists say estuarine bottomlands are the most productive areas on earth. Geologists say it took nature 20,000 years to create a marsh. Yet in a matter of days, drainage and filland dredging can ruin them forever.

There can never again be fruitful spawning grounds at Ft. Lauderdale, or Lake Worth or Upper Biscayne Bay, or Tampa Bay, or Boca Ciego. The South Fork of the St. Lucie River at Palm City can never again be a clean, clear, deep river -- once called by the late President Hoover the finest fishing in America. The grounds are sterile, the waters polluted, the silt-laden bottoms dead.

Marshes and baybottoms are a "Factory" of basic animal and plant nutrients, contributing to the fabulous wealth of coastal waters that support our fish and shellfish resources ... indeed they are the very essence of the chain of life. They are delicately-balanced complexes as fragile as an eggshell. Each acre is irreplaceable. And what we save now is all that ever will be saved ... the rest is gone.

I hope from the bottom of my heart that these ecological experts here can naildown those vital points to you. They're hard for many well intentioned people to accept, for traditionally Americans have looked on wetlands as wastelands. Very few citizens have any great love for a swamp, indeed are more often than not a bit afraid of these areas of muck, shifting sands, pungent odors, mosquitos, creeping and crawling acquatic creatures, strange sounds in the night and lonely solitude by day. Yet they are vital, and must be preserved.

I hope by this point you've decided that as a conservationist I'm emphatically opposed to dredge and fill. I'm not opposed to growth and progress -- but I want it to be wise and carefully done to preserve natural values. I want it to be kept within bounds and tailored to scientific ecological knowledge. I want to preserve a heritage that truly for Florida is the goose that lays the golden egg.

Any development can be done and still preserve natural values and esthetics, too. We have right here in Martin County some good developments that have done no ecological harm at all yet have produced high-quality, highly desirable residential communities. We have some others in which compromises were made yet they saved anywhere from 60% to 80% of the natural values. And we have some atrocities too. Our fear is that with accelerated growth we'll be faced with more of this latter kind..which believe me, we're prepared to fight. And prepared to win too, for the whole direction of high-level public and political thought--both nationally and in Florida--is toward better conservation.

I've said I was against dredge and fill as a conservationist. There's nothing unusual in a conservationist taking that position. But now, after several weeks of reading and study and thought on the economics of preserving our bottomlands, I'm against it as an economist as well...and I believe that there are facts to prove that viewpoint.

I'd like to start the purely economics part of my remarks with a quotation from one of the most respected economists in the United States, Dr. John F. Sly, of Princeton University. Addressing the Florida Industrial Council, Dr. Sly had the temerity to say to this group:

> "You are interested in improving Florida's position as an industrial state. Sometimes I wonder why there is this great urge for industrialization. In the private sector it means higher standard of living for those who profit: and in the public sector it means larger tax bases to support more and better public services to attract still more people.....but there is another side. No one wants to turn Orlando, St. Petersburg or Tallahassee into another Newark, Jersey city or Trenton. We are looking for what we call "Polite" industries; no smoke, no dust and a high quality of professional and technical personnel. The new industrial plants that have recently located in Florida seem to fit rather well into the "Polite" category....there is this question, however: How much industrialization do you want? While the Florida Council of 100 is pushing this ratio up, would it not be wise to have another Florida Council of 100 equally dedicated to the development and preservation of Florida's great natural and social values which in spite of all the impressive economic indices is what really brings people here."

Back just after World War II I participated in an operation for the United Aircraft Corporation that has a definite relationship to Dr. Sly's caution. At that time I was with the company that had United Aircraft as a client. Under the pressures of diversification and dispersal as required after the War, United Aircraft was looking for other locations for factories. As part of the decision on where to locate new factories, the problem of where professional executives and skilled technicians would like to live, and would therefore be attracted, was important. To get a check on this, we ran advertisements in various parts of the country asking prospective employees to hold up their hands. The ads were all the same except for the proposed location of the factor--some ads said Connecticut, some California, some Arizona, some Texas, some Florida. So people really were picking the place they wanted to go. The overpowering majority--more than all the other states combined--answered the Florida ad. In the questionnaire that followed-up the inquiry, more than 70% gave as their reasons "Good fishing and good waters." Without these assets for Florida, the location would have been elsewhere where freight rates, transportation, raw materials, etc. were more advantageous.

I know intimately another company that moved to Florida solely because the head of that company wanted to live and work in the area where he and his family had fished for 35 winters. I'm sure that Florida's natural resources--and, most importantly, their preservation--are a major component of the economic hopes we have for industrial growth.

Another economic generality: one of the major political excuses and speculative arguments for unnecessary dredge and fill is the statement that "we must get those wastelands on the tax rolls." This indeed is a snare and a delusion.

Never in history has the addition of property to the tax rolls reduced an individual's taxes. Always has the cost of serving, and the investment required, gone up as an area grew, not down. All you have to do is look at your own tax bill over the past few years to see that. Or check the tax rates of various size cities. Invariably, if we want growth and development for other reasons, OK. But let's not kid ourselves, or try to kid others, that we want it to get land on the tax rolls.

A survey in Log Angeles County showed that the long-term investment to serve growth worked out at $10,500 per new family. At that rate, it would take 50 years even to get the bait back, and realistically the only answer is increased taxes, which is exactly what has happened. For instance, right here in Little Martin County it costs $418.60 per year just to send one child to school. How many new homes--waterfront or not--represent a sound economic reason for filling lands to get lots on tax rolls?

Most dredge and fill development has been done, and is desired by developers, for the economic reason that it was the cheapest way to acquire land. Submerged lands even recently have been sold for as little as $200-$400 per acre. Some recent sales on main traffic arteries have gone for $1500 to $1700 per acre. Dredge rights for surrounding acres then are sold -- and despoiled -- for as little as 3¢-5¢ per cubic year of fill. Operations and bulkheading are done for $2000 per finished acre. Roads, curbs and drainage don't enter the cost because they would have to be performed on any land. The result is that for $2500 and up per acre choice waterfront locations have been acquired.

Where such submerged lands -- in minimum amounts -- should be included in a sound development plan, they should be priced at amounts that adequately repay the public who owns them for their loss.

What is their worth?

In the past, various formulas have been used -- all the way from prior sales to the appraised value of the finished land. I submit this is not their worth to the public which loses the good fishing they provide.

Florida has not made -- but should -- economic studies of the value of its productive bottomlands. Other states have, including California, Texas, Alabama, Virginia, North Carolina and other.

The annual production value of these landshas been stated by scientific appraisal at from $200-$356 per year in Alabama. $380 in Texas. Oyster bottoms in the Chesapeake at from $1000 to $2500 per year. This is annual value, and should be capitalized.

The Laguna Madre behind Padre Island in the Texas Gulf is very similar to the Indian River Estuary. The University of Texas established its annual production value to the state at $370.18 per acre. Capitalizing this at 5% or 20 times -- gives a shocking view of the true value: $7403.60 per acre. Then add the value of the 2 acres that are despoiled for every acre filled and you get $22,210.80 per acre that the land is worth based on its production value. This is not a bubble-headed figure, but a sound capitalization of annual production that is followed in the stock market, in the sale of farm land or apartments, or in any other income-producer. This is the economic value -- to Florida -- of our vital spawning areas and nurseries.

Obviously there occasionally are situations and areas where sales of bottomlands should be made. But an appreciation of their long-term value enables us to start from an understanding of their true worth, and will make us go slowly, will make us be sure the plan is right and in the public interest, will keep unwise sales to a bare minimum.

Now for some figures that don't require such an abrupt change of theory and thinking. I hold no brief for the absolute accuracy of these values (and I'll explain how I got every one of them), but after all, my purpose is to present a viewpoint on the economic value of Florida's bottomlands, bays and estuaries. The figures are reasonably correct - can't help but be - and certainly show we're not talking about peanuts. They demonstrate the tremendous stake we have in the maintenance of good fishing -- which can be maintained only if we maintain our vital spawning and nursery grounds.

Some of the values I'll use are completely accurate, actual recorded facts. Others are based on excellent research that is accepted by private industry and by State and Federal Governments alike. Others are conservative "educated guesses" based on my own reading and research of Government documents, industry figures and scientific opinion. They are so important to the present and to our future growth that they should point the way to a preservation program of the sternest kind. Bear in mind these are annual figures.

The value of Florida's commercial fishing is a matter of record. However, the State statistics represent only the actual commercial landings, and the salt water conservation board estimates that they could at least be doubled to account also for the sales of private fishermen. I have not done that, which makes this figure extremely conservative. For 1963 Florida's commercial fin-fish production was worth..............................$ 30,790,109.00
our shellfish amounted to.................................... 21,331,218.00

Even bait is a substantial business. Records are kept only on shrimp, which bait dealers tell me is less than 1/4 of the bait business. Live shrimp alone produces a business of $1,382,362 and projected to 100% this is a dollar-volume -- bait alone mind you, of.. 5,529,448.00

Boat sales are a tremendous business in Florida. We have 3% of the U. S. population, but 4.8% of the Nation's recreational boats and we use them more than in other states. So, 4.8% of the engine and boat manufacture assn.'s figure of a $2.605 dollar industry sets up for Florida a conservative annual figure of..... 125,040,000.00

Boat fuel and upkeep are an "educated guess" as no specific figures are available. However $200 per boat annually for fuel, bottom painting, insurance, repairs certainly is conservative. Boat owners among you will know it is ridiculously low. Multiply this $200 by Florida's 385,000 recreational craft and you get an annual figure of.......................... 77,000,000.00

The biggest figure, as you might expect, is the influence of Florida's good fishing on our tourist economy, Florida's Development Commission research and figures are accepted everywhere. They show that tourism is a $2.5 billion dollar annual business in Florida, and that 31% of our visitors come for the fishing (incidentally, for second-time and repeat visitors the percentage is even higher). The same research shows that an additional 18% come for boating, but I have used only the fishing figure. I don't think anyone could deny that good fishing produces 31% of Florida's tourist economy, so that figure amounts to.. 775,000,000.00

We've all seen the waterways and marinas crowded with out-of-state boats. These visitors are free spenders and stay many weeks or months. However, I've used only the average figure of an 11.3 day stay, and the average expenditures of $244.35. Multiplying these low figures by the 110,000 people who come by boat each year shows an annual expenditure of....... 26,878,500.00

Fishing tackle sales, based on the projected income from the 5% special fishing tackle tax amount to more than.......... 40,000,000.00

I'm sure that's low -- my wife talks as though I spend that much myself!

Here's a guess but an "educated" one. Charter boats are big business and each year produce............................ 23,250,000.00

This is 3100 boats, multiplied by one-third of the year or 125 days, multiplied by an average day's fee of $50. Charter boatmen I've interviewed believe these estimates to be conservative.

You can estimate the business of the hundreds of big marinas scattered around the State. Hundreds of millions of dollars have been invested and the income must be substantial. However, I've used only 27,500 visiting boats, times a $5 per day dockage fee, times a 13.5 day stay.

That amounts to.. 1,856,250.00

The total of these direct figures -- and, I repeat, I believe they are completely conservative -- adds up to an annual expenditure, directly dependent on the maintenance of good fishing in Florida, of $1,126,975,525. I want to emphasize these are annual figures, and say again 1-1/4 billions a year isn't peanuts!

Now you can quarrel with the figures if you want to. Whether they are of absolute accuracy is not the point. They are reasonably accurate, they are completely conservative -- and they make the point that good fishing is a fantastic economic asset for Florida. It can grow each year. It must be maintained.

There are other economic assets to the maintenance of good fishing. Convention business in our bigger cities for example. It's more than coincidence that the charter boat fleets are sold out weeks in advance of a national or regional convention.

Of all the Florida tourists 6% admit they are here looking for homes and property. That's 852,480 people here each year looking for homes.

160,000 people each year represent the in-migration of people who come here to make their homes. It is estimated that more than half these people are the highly-desirable "affluent retired" who choose Florida over Arizona, California, Nevada and other retirement states because of our waters and fishing. This means the building of 50,000 or more homes each year at an average certainly of $15,000 -- which is an annual construction business of $750,000,000, plus all the service and retail expansion it makes possible.

A brief word about the economic value of this class of resident would be appropriate here. These are people who no longer need to save their money or carry investment or life insurance programs. They spend the bulk of their incomes. They don't have children to go to school. Their properties are already improved. They make few requirements on local government. The area in which I live -- North River Shores -- is a good example. This development, incidentally, was done with no ecological damage, as a matter of fact with some improvements. Our 137 homes -- most of whose owners are retired and picked this area for its fishing -- pay over $50,000 in county taxes. We have only 18 children in school and 32 street lights, for a cost to the county of $7,534 -- a clear profit of $42,466 - 700%. Certainly this type of settler is an economic asset to Florida, and they number in the hundreds of thousands in our State largely due to good fishing.

Well ... I'm about at the end. I hope I've demonstrated the tremendous economic stake Florida has in the maintenance of good fishing, and therefore, in the protection of its vital bottomlands and spectacular estuarine resources. We've ruined them at an alarming rate, and we must stop. An understanding of their basic economic value will, I hope, stimulate added strength and emphasis in stopping their sale.

I'd be remiss if I didn't also make the point -- entirely beyond economic dollar figure -- that these bottomlands have great value to the Florida tax-paying public who own them. Legally, as I understand the plainly written words of the law, title to all submerged lands, bay bottom and estuarine lands seaward of the line of mean low tide are vested in the "inalienable ownership of the general public, to be guarded for the public good by the State."

And does this public use and benefit from these lands? They certainly do! The Recreation Commission has figures showing that 42.5% of our citizens are regular salt water fishermen - 31.3% regular salter water boatmen. They spend 59,800,000 man days on the water -- which is an average of at least 14 days a year for every soul in Florida! That's heavy usage, and of great value to every resident.

I think any speaker who has the temerity to set forth his ideas and convictions on a problem, should also have some ideas on a solution. I have some and here they are:

1. Since the bottomlands are owned "inalienably" by the people, their rights and interests should take precedence over the rights to private profit at public expense. This is not to say that some lands shouldn't be filled. It is to say that such projects should be carefully considered, should be held to a bare minimum, should be strictly controlled, and should be approved only after a clear cut demonstration that they will advance the public good. Also, this is not to say that riparian rights are not real. They are, but basically they are limited to right of access, use, protection and view -- not to a private right to profit by destruction of valuable public property. There's been too much of that in Florida. If this proposed policy were followed, development could be made reasonably

non-destructive and could be limited to only wise and satisfactory plans.

2. We should educate constantly that bottomlands are valuable, and when necessary should be sold only at a price that represents their true value to the public, not the estimated value of the completed land, and should be sold only in absolute minimum quantities.
3. There should be the requirement for an ecological survey prior to any sale. Rarely, some bottomlands are sterile or of minimum value. Further, such a study will develop ideas and plans that will result in minimum damage. In most casses -- if adequate values are placed on bottomlands -- plans can be worked out to develop landward of the water rather than seaward, and everyone benefits.
4. Severe engineering restrictions should be placed on the operation. Dredging is even more destructive than filland should be discouraged. Access channels should be drag-lined rather than sucked up, destroying countless additional acres. Any dredging approved should be from beyond the euphoric line, generally recognized as six-foot depths or greater. Fill from the outside should be encouraged in place of dredging. Tidal flats, mangrove growth, islands and pristine areas should be set aside for preservation. Imaginatively done they can add to the final value.
5. Bulkhead lines should be minimum, should be area-wide and should follow natural shorelines. Both Florida and U. S. Conservation Authorities recommend one foot below mean low water as the bulkhead line. This recognizes that dredge-and-fill is a vicious circle -- one project begets another until total destruction sets in. The loss this is

progressive -- less bottom, less food, less life-subsistence, less fish and crustacfans -- ultimately leading to sterility.

For the fishermen among you -- and for those who only eat and don't enjoy the royal sport of catching them -- let me give you one final quote, this one from Dr. Lionel A. Walford, Director of the U. S. Sports Fisheries Marine Laboratory at Sandy Hook: "Most of our important fish depend on the part of the coastal plain biologists call the estuarine zone. This includes bays, rivers and tidal creeks. Fish eggs drift shoreward and the tiny larvae are carried into the shallow fertile waters of the estuarine zone. Here they are nourished and protected until large enough to fend for themselves at sea. Man is ruining the estuarine zone at a frightening rate. Pollution of the waters with waste materials, herbicides and pesticides is helping ruin the zone. But worse is the filling in of large stretches of the zone to make more land, and by so doing, forever obliterating it as a habitat for acquatic life."

The fish he is talking about, including many others, are sea trout, mullet, striped bass, flounder, redfish, pompano, snappers, snook, drum, tarpon, cobia, spiny lobsters, blue claw crabs, shrimp, oysters and clams. What a dreary Florida without them -- to catch and to eat! This is all serious business -- serious for Florida and for many other parts of the United States. It no longer is political maneuvering to make submerged lands available for private development. The whole subject has a tremendous bearing on the economics of Florida, on the protection of resources for our present and future residents, on our solid growth in wealth and population, even on our growth in the clean type of industry we want.

I have documented direct monetary values of more than 1-1/4 billions a year. Add new home construction, high spending retirees, attraction of additional industry, and all the other factors I've only mentioned -- and carry away with you some idea of the stakes involved.

I haven't talked about the beauties of natural conditions, the values of wildlife, the need in this hectic world for the honest recreation they provide. To many millions of people these esthetic values far exceed the dollars and cents that figures show.

I hope by putting an economic evaluation on the value of our Florida bottomlands I've advanced the cause of their preservation.

Statement to Public Meeting in National Estuarine Pollution Study, March 12-13, 1968 at the Pack Plaza Hotel in Orlando Florida.

By

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An estuary can be defined as a semi-enclosed coastal body of water which has free connection with the open sea and within which sea water is measurably diluted with fresh water drained from land drainage".

It is generally recognized that four types of estuaries exist with relation to circulation patterns of fresh water and salt water within them. These types are based upon the width of the estuary and flow ratio which is ratio of fresh water discharge during a half-tidal cycle to the tidal prism, (the volume between mean high and mean low water). As river run-off diminishes,the flow ratio decreases and amount of mixing increases. Thus one would expect river fluctuations to effect estuary type. Also, the tidal range would effect flow ratio, thus estuarine type. The two-layered estuarine or stratified system with its sharp vertical gradients would exist under conditions of low river run-off. If mixing due to tidal action was great and river flow low, a well-mixed uniform estuary would exist.

Florida has a coastline of 1350 miles, 580 miles of which are facing the Atlantic Ocean, and 770 on the Gulf of Mexico. If one considers the additional coastline added by swamps, sloughs and river mouths, perhaps the true coastline would be increased as much as ten times. Major estuaries exist where rivers neet either the Gulf of Mexico or Atlantic Ocean. The largest include on the Gulf the following bays: Pensacola, Choctawatchee, Apalachee, Waccasassa, Tampa, Charlotte, and Florida. However, estuarine conditions occur in small river mouths such as where rivers like the Ochlocknee, St. Marks, Aucilla, and Wacissa enter Apalachee Bay. Major Atlantic estuaries include Biscane Bay, and the St. Lucie and Indian

River estuaries.

Estuaries are of extreme importance to biological life. Many forms of marine life such as shrimp must spend part of their life cycle in the low-salinity waters of estuaries. Also, estuaries are extremely productive regions due to high nutrient contents derived from land drainage, hence would be sources of high food content for organisms. People point out with pride that Florida's forests produce high yields of organic matter up to 6,000 pounds per acre. Yet, phytoplankton, the microscopic algae which produce organic matter by photosynthesis, hence are the basis of all marine food chains, produce on the average 36,000 pounds/acre. Of course, not all of this would be utilizable by higher forms of marine life such as shrimp, shellfish, or fish but approximately 600-800 pounds/acre per year of fish such as menhaden could be produced from this amount of phytoplankton. This is a greater yield than could be expected in terms of pigs or cattle per acre. Estuaries are the most productive of any environment on the earth's face, and more than double in the organic productivity of offshore marine areas.

Important Florida marine species that must spend part or all of their life in estuaries include lower forms such as oysters, blue crab, stone crab, spiney lobsters, white, brown, and pink shrimp. Important fish would include croakers, red fish, weakfish, anchovies, herring, menhaden, mullet, butterfish, flatfish, and jack. In terms of the Gulf States, 97.5% of all commercial marine species harvested spend part, or all, of their life in estuarine environments while 2.0% are strictly oceanic species, and 0.5% fresh-water species.

Prior to 1850, man's activity had little impact on estuarine environments, and was limited to human waste disposal and silting due to erosion of agricultural lands. That has rapidly changed, and today pollution problems exist due to man's inability to control various forms of pollution. For example, Baltimore Harbor has added to it daily 400 tons of concentrated sulfuric acid. The Potomac estuary receives 27,700 pounds of phosphate and 68,100 pounds of nitrogen daily from the human sewage of Washington, D. C. In terms of biocides, 35 million pounds of arsenical salts, 45 million pounds of copper sulfate, 6 million pounds of organic phosphate, and 130 million pounds of chlorinated insecticides per year are being used each year in the United States. Many of these substances and their oxidation products reach the estuarine environment. DDT residues have been found in Antarctic life even though the nearest source of use of this biocidal material is in South America!

In terms of marine or estuarine pollution, the following schedule illustrates the main forms and sources of pollution:

1. Domestic (Household)
    a. organic wastes
    b. detergents
2. Industrial
    a. pulp and paper industries
    b. oil pollution
    c. metal industries
    d. thermal pollution
    e. nuclear reactor wastes

3. Agricultural
    a. fertilizers (inorganic)
    b. pesticides, herbicides, insectcides, fungicides

Domestic sources of pollution are being reduced with imporved sewage treatment and the development of biodegradable detergents. However, even though solid wates are removed from water, nitrogen and phosphorous may be added to waters. This has caused undesirable forms of phytoplankton to occur in Long Island Sound causing declines in oyster yields in the region.

In terms of industrial pollution, paper and pulp production is a most serious potential Florida problem. Both the sulfite and sulfate digestion processes used by this industry remove oxygen from water, while the latter process can add toxic sulfur substances into an estuarine environment. A less important source of pollution from this industry would be addition of wood fibers to estuaries which can coat the bottom of the estuary, seriously effecting bottom-dwellers. Suspended fibers reduce light penetration, reducing the amount of organic production by algae. Oil pollution is localized, and recently in the St. Marks' estuary some bad spills have occurred. Visualize the effect of massive spills upon a Miami tourist beach! Oil pollution can also be a serious threat to water birds and shellfish. Thermal pollution, or addition of heat to estuaries can be from several sources including industrial cooling, nuclear reactors, or water running entrapped behind dams, or in rivers that have been reduced in speed due to dams. This can be harmful to organisms requiring low temperature water. Besides thermal pollution, nuclear reactors replace radioisotopes into rivers and estuaries, and could cause health problems since some health experts believe that even the lowest level of radioisotope addition could be dangerous.

Agricultural pollution includes fertilizer additions which can lead to undersirable algae forms, and pesticide, insecticide, herbicide and fungicide additions, all of which can present a serious health problem to marine life, birds, and man. Several examples of declining reproduction in birds due to pesticides have been shown lately including petrels, the golden eagle, and peregrine falcon. The decline of polulations of some of these predators could lead to infestation of insect pests, and increased biocide usage.

Another form of pollution to a fresh or brackish-water environment not normally considered as such is that of salt-water intrusion. Recently such an intrusion has occurred in the Everglades' estuaries due to lowering of water levels into the region. These estuaries are important to the life cycle of the pink shrimp which require low salinity environments for part of their life. Increased salinity could cause damage to estuarine species requiring low salinity during certain periods of their life. Sudden changes of temperature, salinity, and dissolved oxygen can cause mass mortalities of estuarine life, and have done so in the Gulf region, however, a change in salinity could be beneficial. Fresh water from Lake Okeechobee has been released at times to the St. Lucie estuary. If this release coincides with breeding of such species as anchovies, mullet and menhaden, a greater abundance of young of such species has been noticed. However, fresh water release to estuaries at the wrong time could conceivably cause kills of species that require higher salinity waters.

Even in the case, of various biocides, one may see at times beneficial responses such as the control of undersirable forms of crabs, and certain snail predators of oysters. DDT has been found to prevent setting of barnacles which compete with young oysters. This is not to say that one should add DDT to an estuary without examing its effect upon the entire ocosytem, or without studying possible side effects which could take place under varying environmental conditions. For example, as low a concentration as 0.05 parts per million of DDT has been found to kill up to 90% of oyster larvae in a 14 day period. Also, different species have different tolerances to various biocides. Brown and pink shrimp are extremely sensitive to such biocides as endrin, heptachlor, and lindane. Levels as low as 0.3 parts per billion have been noted to kill up to half of adult commercial-sized shrimp. Virtually every foreign chemical must be viewed as a pollutant. We cannot afford to repeat problems that occurred due to pulp wastes on the Fenholloway River, and pesticides in the Indian River estuary.

Research must therefore be performed on estuarine pollution and the oceanographer, whether his speciality is physical, chemical, biological, or geological oceanography can contribute.

a. PHYSICAL RESEARCH - Various physical aspects of estuaries need to be investigated in terms of pollution research. These include patterns of flushing, circulation, vertical mixing, light absorption, current directions and velocities and salinity distribution. Such studies need to be carried out in the field, under carefully-controlled laboratory conditions, and by the use of physical and mathematical models such studies would lead to where and what time should a possible pollutant be added to an estuary for safest dispersal, what quantity should be added per unit of time, and how the pollutant will be dispersed when it reaches the ocean.

b. CHEMICAL STUDIES - Florida, especially in the northern Gulf is an ideal place for such studies due to lack of pollution. Thus, the region would be a good "base-line" to determine what future problems could take place. In the realm of chemical studies, several things should be investigated including types of pollutants and their behavior in water of varying salinities, the nature of complex industrial wastes, the release of pollutants from or retention of pollutants, in estuarine sediments. Also, trace metal studies in Florida estuaries should be made, since future industrial development could add toxic levels of certain metals such as copper or zinc. Again, certain levels of pollutants could actually be beneficial and increase productivity in the estuarine environment. These may include phosphate (from either phosphate mining and sewage decomposition), nitrogen (from sewage) and certain metals such as iron, manganese, and copper. However, beyond certain levels growth of undersirable forms of algae could be stimulated, or toxicity problems develop. Base levels must be determined of biologically-active elements so that pollution effects may be evaluated before certain types of industry become developed.

c. BIOLOGICAL RESEARCH - Unfortunately, little is known about the biology of commercially important species such as shrimp and oysters. Basic studies need to be carried out in such areas as nutrition, genetics, physiology, reproduction, and morphology in order to determine pollution effects and possibly develop pollution-resistant varieties if necessary. Work needs also to be carried out on pollution effects upon phytoplankton and zooplankton since these are the basis of all life in aquatic environments. These minute forms of life are able to concentrate pollutants and transfer them to higher forms of marine life. Little is known upon the effects of pollution upon plankton especially the plant forms. Biological studies need to be performed in the field and under controlled laboratory conditions, on species which are suitable. Pollution indicators should also be determined.

d. GEOLOGICAL STUDIES - Here, studies need to be done on silting and sedimentation rates, location of sedimentation, the release of pollutants from estuarine sediments by dredging and construction of canals, and factors influencing accumulation of pollutants in sediments.

Marine preserves should be established for purpose of research. These normally would include estuarine areas previously unpolluted by man. Such regions would be kept in their natural states for physical, chemical, biological and geological studies. If necessary, such preserves may have to be closed to all human activity including recreational boating. Also, preserves should include some polluted regions so that research may be done to investigate changes due to pollution. However, base-line studies of typical Florida estuaries need to be done first in order to characterize such areas before they might become polluted, and to prepare for future industrial development which may pose possible pollution hazards. Accidental pollution due to such factors as shipwrecks, accidental dumping of biocides and oil spills, have, and will occur in the future. Research studies should be performed in these cases as soon as possible in order to evaluate potential hazards to marine life or human health. However, base studies again are needed since it is of little value to determine environmental changes unless the original environment was well-characterized.

Also, trained personnel must be available to do estuarine and pollution research. The Department of Oceanography is best qualified to train such personnel since a proper study of estuarine pollution involves physical, biological, chemical, and geological research. Oceanography has been traditionally a multi-disciplinary field embracing those four areas of research. However, training in oceanography may have to be supplemented with limnology, the study of fresh-water environments such as rivers and lakes, since an estuary is a region where fresh water meets salt water.

Florida State University's Department of Oceanography can provide both the teaching facilities to train future estuarine-oriented scientists; and can perform the necessary research into the physical, chemical, biological, and geological parameters of the estuarine environment as related to pollution problems.

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YOUR REFERENCE

YOUR LETTER OF

IN REPLY ADDRESS FIRM AT ORLANDO OFFICE AND REFER TO:

85-53C-GSr.5

April 2, 1968

Mr. John R. Thoman
Federal Water Pollution Control
  Administration
Suite 300, 1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Enclosed is a copy of a statement prepared in connection with the hearing of the Federal Water Pollution Control Administration in Orlando, Florida, on March 12 and 13, 1968.

I would appreciate your review of this statement. It was not presented at the time of the hearing because I did not receive direct notice of the hearing in time to prepare it.

Very truly yours,

J. Thomas Gurney

Encl.

STATEMENT ON BEHALF OF THE ORLANDO UTILITIES COMMISSION TO BE FILED AS A PART OF THE RECORD OF THE HEARING OF THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION HELD IN ORLANDO, FLORIDA, ON MARCH 12 AND 13, 1968. *

When you arise from your bed in the morning, one of the first things you will do, or someone will do for you, is to turn on some type of electric appliance, and the last thing you will do that night will probably be to turn out an electric light. Throughout the day electrical energy has served. It has cooked your breakfast; it has washed your dishes; it has washed your clothes; it has cleaned your floors; it has furnished you the music of the masters; it has operated your typewriters, your calculators and your computers; it has served the rich and the poor alike; it is the common servant of mankind. Its service is as varied as are the needs and comforts of man. No one ever anticipates that it will not be there when called upon, and when a blackout occurs it is considered a phenomenon, but electrical energy does not just happen, it is caused.

The ingenuity of man has been taxed over the years to provide more reliable, more efficient, and more adequate electrical services. As each year goes by the amount of electrical energy consumed increases and signs are written on the wall of the necessity for increased production. Those who produce electrical energy must be ready when the increased demand comes. They must

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* Presented by J. Thomas Gurney, General Counsel of the Orlando Utilities Commission.

anticipate; they must go into the money markets and obtain funds and build plants that will generate this precious handmaiden of labor.

Generating plants must be built and care must be taken that they be built in order that their product may be supplied to the general public at a reasonable cost. Next to food to satisfy our hunger and water to assuage our thirst, it is probably the thing we can least afford to be without. Generating plants must be located in areas which provide for them the best advantages for the generation of electrical current at a price within the reach of all.

One of the essential elements in any generating plant, even atomic plants, is the use of cooling water - water taken from a natural stream, or bay, or estuary, pumped through the plant and returned to the same body of water whence it came. Nothing is taken from this water except its cooling effect, and nothing is added to it except a few degrees of heat and occasionally some bit of chlorine to prevent growth in the intake pipes, which is immediately dissipated upon discharge. Most drinking water, as a matter of fact, is treated to some extent with chlorine. No chemical change of a permanent nature is involved. The temperature of the water is raised a number of degrees, depending upon the season of the year, the efficiency of the plant, and a number of other factors, and might vary from five to perhaps, in some extreme instances, twenty degrees. The water when it is returned to the natural sources whence it came, then mixes again with the waters of that source and, dependent upon the mixing area available, returns to the same temperature of its environment. It may again then be inducted into plant and the cycle continues.

In most operations at least, of which we have knowledge, the intake and the outfall areas are not far apart, and the fact that the operation is efficient and successful is probably the best proof which could be offered that there is nothing really serious in the change of temperature. Such an operation would not be practical or feasible if the water expelled from the plant did not, within a reasonable time and area, return to its normal temperature; otherwise, it would come back into the plant in an artifically heated state and the operation of the plant would, to that extent, be very inefficient. So it is obvious that if the water cannot readily be returned to its normal temperature in a reasonably small area, the operation would be self-defeating.

In recent years, there have been definite signs of the necessity for protecting the waters of this country, its bays and estuaries, from pollution and contamination. By far the greatest danger, of course, exists in the contamination from human waste or industrial waste bearing a chemical content or composition and constituting a threat to marine life, as well as the possibility of danger to human life through the use of products of the sea which might become unfit for human consumption.

In Florida this concern, or such contamination, becomes more and more significant by reason of the advance in our population and the tendency to urbanize those areas adjoining estuaries, bays and the like. It is a fact well known, that whenever and wherever human beings congregate there is pollution of natural conditions. Even a group of people confined in a room without access to fresh air, contaminate the air by breathing and eventually such contamination would overcome them and such pollution would destroy them.

Now the Federal Government, through the Department of the Interior, apparently is associating with this type of pollution another type of pollution which they designate thermal pollution. This is the pollution referred to above in describing the use of cooling water by an electric power generating plant. There seems to me to be a great difference. There is no question among scientists generally, but that the depositing of human waste or industrial waste in an estuary of the sea will, to some extent at least, have a damaging effect upon marine life and even, in some instances, upon human life, if the products of the sea in that area are consumed by humans.

There has not been, however, so far as we can learn, any scientific basis established for the conclusion that by putting water into an area at a temperature up to twenty degrees higher than that of the environment, where there is a reasonable opportunity for mixing with waters of normal temperature, it could be said that marine life has received any serious damage. There have been expressions of opinion to the effect that the raising of the temperature in the water expelled into the reservoir or estuary, caused it to lose oxygen and that hence it must be damaging. Some scientists have expressed a directly contrary opinion and some have indicated that in many respects it might be helpful to the area.

The paper submitted by Dr. Andrew J. McErlean, from the University of Maryland, in the recent hearing in Orlando, apparently indicated as best I could interpret it, that much more experimentation was required before any definite conclusion could safely be drawn with respect to the effect of this rise in temperature of the water. Experiments which he has apparently performed, and the observations which he had made, of course related to the Chesapeake Bay area. Upon questioning, he himself said he thought there might be a wide differentiation between tolerant temperatures in Florida waters and those in the Chesapeake Bay. He was speaking at the time of fish and marine life.

In certain seasons of the year in Florida, we all know that water temperatures in estuaries and bays may well normally reach ninety-five degrees. Fish life and other marine life have existed in these waters for ages past and are, of course, indigenous to waters which reach high temperatures. While it is not the greatest of phenomenon to see fish floating in the water in Florida dead as a result of cold, it would be a phenomenon, I think, if one should find fish which have died here because of warm water. In fact, at the outfall of some of the generating plants where the water is warm, larger numbers of fish will gather in cold weather for the purpose of taking advantage of the warm water.

There is danger in any action by the Federal Government in placing restrictions upon power plants charged with the responsibility of providing electrical energy for an expanding population, without first having established, as an indisputable fact, that damage is being caused in an appreciable amount, in the use of cooling water from the estuaries in the State of Florida. It must be remembered that these plants are not built because of the desire of the power generating systems to build them; they are built because of the requirement that consumers be furnished with an adequate supply of current. This is an obligation to the public.

Furthermore, it would seem that it would be most practical to determine by comparison the relative advantages of the production and adequate supply of electrical energy to the damage which may be resulting in the particular area. There is danger in generalization. It would be unfair to compare conditions in Florida and water temperatures in this State and its estuaries, with those in Lake Erie or in the Chesapeake Bay. For example, it has been suggested that the Federal criteria would be the return of cooling water back to its source at a temperature not in excess of ninety-three degrees. If this were a proper tolerant temperature requirement in Lake Erie or in the Chesapeake Bay area, it certainly would not be a proper one in the warm waters surrounding the State of Florida. The reverse of that might also be true, in that the tolerant temperature here for such purpose might not be applicable to other areas of the United States.

This raises a very important question of local regulation. To place under the same regulation the States of the Northeast and the North, and those of the Southwest and the Southeast, would be a re-enactment of the fabled story of Procrustes who cut off the legs of his guests if perchance they were too long for the bed. Even before any such standards are determined, however, it seems to me that much more data and experimentation must take place first to prove that there is a problem. Thus far no one has produced that proof.

Certainly, insofar as Florida waters are concerned, there was one conclusion which was common to all of the experts who presented statements at the hearing in Orlando, Dr. McErlean from the University of Maryland, Dr. C. P. Idyll from the University of Miami, and Dr. David D. Woodbridge from Florida Institute of Technology, namely, that there is insufficient evidence at this point in research to establish that any damage is being inflicted upon marine life of any consequence by reason of the use of cooling waters from estuaries in this State. Some opinions were advanced by Dr. McErlean from the University of Maryland, based upon experimentation and research on his part and that of his associates, which were conducted in an area quite foreign and quite different from the climatic conditions which exist in the State of Florida.

This establishes the inescapable conclusion that there is probably no regulation with respect to tolerant temperature at which cooling waters could be expelled into their source which would be fair, reasonable or wise in its application throughout the United States. For example, what might be perfectly tolerant and fair and wise in Lake Erie or in the Chesapeake Bay, might be intolerable, unfair and unwise in the waters of the State of Florida. Fish in the State of Florida are indigenous to warm water. They are warm water fish.

To propose a nationwide restriction, irrespective of climatic conditions and of other varying circumstances in various parts of the country, would be impractical, unwise and unfair. Even within the State of Florida itself conditions vary and to such an extent that it would hardly be equitable or fair for such restrictions to be constant throughout the State.

This would almost demand that local arms of any regulatory agency should be established and should be charged with the responsibility of judging various locations and the extent of the problem in the particular locations involved. For example, there are at least eight municipally owned and operated electric generating plants using waters of bays, rivers or estuaries in the State of Florida. These include Tallahassee, Jacksonville, New Smyrna Beach, Orlando, Vero Beach, Fort Pierce, Lake Worth and Key West. There are at least three others, Sebring, Lakeland and Gainesville, which use the waters of large inland lakes. Mixing areas vary in each of these locations. Quantities of water used likewise vary. The problems in Tallahassee, if they exist, might well be different from those in Lake Worth. The mixing area available in the Indian River might be quite different from that available in other estuaries in the State. All of these should be considerations and should be taken into account by local regulatory agencies to determine if a problem exists, and if so, the extent of such problem.

I would not attempt to speak in behalf of any of the other municipally operated plants within the State of Florida, but I do think that our situation is representative, to some extent, of them all.

Since electrical energy is a necessity of life because of the universality of its use it must be produced at a cost within the reach of all. It is absolutely necessary and fair, if we would view this problem objectively, to take a look at what would be involved in eliminating the small rise in temperature of the water used for cooling condensers.

Incidentally, there seems to be some great variety of opinion, or maybe variety in fact, as to the actual number of degrees by which the temperature of the water is increased by this use. At least according to our records at a very short distance from the point of discharge of the water from the plant, it would appear that the temperature is raised from five to ten degrees, whereas I heard statements made at the hearing in Orlando which indicated that such a rise in temperature might reach thirty degrees. This emphasizes the difference in various installations and would seem to call for the treatment of such installations on an individual basis.

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Certain suggestions were made in the hearing in Orlando which are certainly worthy of consideration. There was some reference to the permanent changes made in estuarine areas, such as causeways, pumping in of land for residential purposes, and such similar changes in the natural topography of the area. It is certainly quite possible that such serious changes in the natural boundaries of estuaries could result in permanent problems and permanent damages.

The so-called thermal pollution does not, of course, present such a problem. It is a self-correcting change of a very limited character. Its effect is limited to a very small area and it is not irrevocable. Since it is self-correcting it does not become cumulative as is the case with chemical contaminants and these things we do know.

There were also suggestions, although not very clear nor distinct, with regard to the methods which might be utilized in reducing the temperature of the water after it has been used for cooling purposes and before it is returned to its natural source.

One of these suggestions was the use of cooling towers. In fact, I believe it was pointed out that in certain areas of the Mid-West and Southwest, this technique is used. In most instances there, of course, there is a scarcity of water, and the water which is available is used over and over. This, of course, is fresh water.

The use of cooling towers is not the answer to all problems and it is hardly an answer at all to the problem in the estuaries in Florida. This is true because of the following:

1. The use of cooling towers on salt water would present an extensive area of salt spray fallout with its attendant destruction of floral life and corrosion of most metallic facilities. The effect on the electrical substation would be atrocious.

2. The increase in capital cost, that is, the cost of installation, would vary from five to fifteen per cent. This would be brought about by reason of the size of the unit which would be required in this part of the country. In certain parts of the country where the evaporation rate is very high, there is an entirely different situation. In Florida, the evaporation rate is low and this would necessitate increasing the size of the facility which would be required in order make any sort of a satisfactory and efficient operation.

3. The plant operating cost would be increased by an amount estimated to be three to five per cent. This increase in plant operating cost is due to the same reasons which contribute to the increase in capital cost for such

an installation, namely, the low efficiency of cooling towers in Florida's humid climate.

It is perfectly obvious that this suggestion, if it is followed and required to be put into effect, would result in an indirect tax upon every consumer of electricity in the service area of the plant. You don't acquire additional capital investments without having to also acquire a return upon those capital investments. This, of necessity, has to be passed on to the consumer and you certainly do not sweep additional operating costs under the rug or kick them around until they get lost. Perhaps it might not be so difficult for plants of tremendously large size and with ready access to the money markets of the world to obtain financing at a rate and to the extent which might be necessary or required to meet such a regulation or any other regulation of similar character. However, for municipally operated plants the opportunities are not so great.

All of the foregoing points up the fact that it is not good government and it is not good business to impose another burden upon the consumers of electricity, unless there is a very distinct and very definite and very substantial demand that it be done; that such demand has been determined after an objective research which clearly establishes it. It is not our belief that the simple statement which, of course, is a physical fact which has been known for many years that the heating of water causes it to lose some of its oxygen content, is enough to place this burden upon consumers of electricity throughout the nation.

CONCLUSIONS

To be fair to all concerned, including the public for whose benefit these plants are installed and operated, I think the following suggestions and conclusions demand consideration:

1. Before any restriction should be imposed upon the operation of these plants it should be determined objectively as a matter of indisputable fact, that there is substantial damage being inflicted upon the marine life by the use of these waters. At the present time this evidence is not forthcoming.

2. Even if a thermal pollution problem is found to exist, a nationwide restrictive regulation should not be imposed without regard to the varying conditions which exist in various parts of the country, particularly with respect to climatic conditions and other contributing factors.

3. If so-called thermal pollution is found to exist and to be of such substance as to require any type of restrictive regulation, latitude should be afforded local regulatory agencies familiar with the problems of the specific locations involved, and each particular location should be analyzed.

4. If a thermal pollution problem is found to exist as to require some procedure of a remedial nature, it should not all be at the expense of the consumer of electrical energy. Certainly in an advanced civilized society one lesson has been learned, and that is that each man may have to yield to some extent in order to make it possible for the other also to exist. A particular service to be performed or contribution to be made by an industry has to be measured somewhat in respect to its indispensability and the extent to which its service is required and the service which it renders to the public at large. No one, for example, would like to see the fishing industry damaged to an appreciable extent, if such damage can be avoided. So far, it has not been established that any such appreciable damage exists. The percentage of water used for cooling purposes out of the estuaries adjacent to the shores of the State of Florida is very inconsequential as compared to the areas of water within those estuaries. Furthermore, it is quite obvious that many more people now use and will in the future use electricity and require it for their everyday comfort and convenience, than will ever be involved in any industry connected with marine life. In these considerations a distinction cannot be maintained between those quasi-public agencies which generate and supply electrical energy, and the public. Power generating plants are where they are because they were necessary there to serve public needs.

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5. Restrictions imposed upon the industry which require substantial capital investment, will be the burden of the consumer and not of the power companies. It is not a question of the power companies finding some way to handle a burdensome restriction, it is a question of how much the consumer will have to pay in order to meet any restrictive measures imposed against those engaged in the generation and distribution of electric power.

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ALEX M. BALFE
PRESIDENT

MERRILL
STEVENS

February 27, 1968

Mr. John R. Thoman, Regional Director
United States Department of the Interior
1421 Peachtree Street, N.E. Suite 300
Atlanta, Georgia 30309

Dear Sir:

This is in response to your letter of February 20, 1968 requesting that I attend a meeting in Orlando on March 12th and 13th to make a statement concerning "pollution". I wish to make the following comment: "Our company is concerned with pollution of streams and waterways since we are primarily interested in the development of yachting and pleasure boating in this state".

We trust that due consideration be given to regulations that will safe-guard our waterways from dangerous pollution but at the same time allow reasonable use of the waters by industry.

It will be impossible for me to attend the meeting. I trust, however, that the thinking of your agency will be passed along to the users of the waterways before enactment of enforcement laws.

Yours very truly,

Alex M. Balfe, President

MERRILL-STEVENS DRYDOCK COMPANY

AMB:mh

"SERVING FLORIDA'S MARINE NEEDS SINCE 1885"

STATEMENT
SUBMITTED FOR THE PUBLIC MEETING
NATIONAL ESTUARINE POLLUTION STUDY
MARCH 12 - 13, 1968 PARK PLAZA HOTEL ORLANDO, FLORIDA

Florida's estuaries are being polluted at an increasing rate by both organic and chemical wastes. In past years the estuarine pollution was primarily wastes from septic tanks and sewerage effluents. Today, the industrial wastes are outstripping the effects of sewage. Some areas have an excess of both. For instance, Tampa Bay is polluted by sewage discharge, having varying degrees of treatment at several points. It also receives the discharge from Alafia River which has considerable chemical pollution.

This increasing pollution is a real threat to Florida's fish and shellfish industry. The spread of estuary pollution to the beaches that are an attraction to the tourist industry would be a serious blow to Florida's economy. We have a long coastline, but the time in which to protect and preserve its natural resources may be short.

The damage being done to estuaries is not the local pollution from a long range viewpoint. The seacoast localities near the estuaries will have to clean up their particular pollution and will do so when they see that their economy is suffering as a result of their fouling their own nest. But how do they protect themselves from the pollution that flows to the estuaries by way of the streams and rivers? This is where the problem of estuary pollution must be attacked. This is where the battle of estuary pollution will be won or lost.

Respectfully submitted,

Bolivar F. Hyde, Jr.
Past Executive Director, Central & Southern Florida Flood Control District

Past Director, Peace River Valley Water Conservation & Drainage District

Former Member, Peace River Basin Board

WAR ON WEEDS SOCIETY, INC.
Route 1 Box 37
Crystal River, Florida 32629

February 23, 1968

John R. Thoman, Regional Director
United States Department of the Interior
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

At the request of Mayor Ayers we are writing you regarding a statement to be made at a public meeting to be held in Orlando, Florida, on March 12th and 13th.

The economy of the Crystal River area, dependent on casual tourist trade, and the building of residences by part and full-time retirees, is seriously threatened by the prolific growth of the aquatic weeds, Elodea and Milfoil. This growthis taking place in all of the bays, canals and the main river. The weeds plug the canals and bay areas, hinder the movement of boats, deplete fishing, and destroy bathing areas. As evidence of pollutionbeing discharged by Crystal River into its estuary, our promising Oyster Industry had to be abandoned. It is not an exaggeration to comment that the area extolled by many national publications as a "Fishermans' Paradise" may soon become a "Paradise Lost".

The Crystal River area, see attached brochure and map, "Suncoast Springs Area" shows a population of some 3000 inhabitants clustered around beautiful spring-fed Kings Bay and its connection to the Gulf by seven mile long Crystal River. The aquatic area is unique and beautiful beyond belief. It offers excellent fishing for all fresh and brackish water species and provides in a few minutes by boat access to the salt water species that abound in the shallows, around bars and in the deeper water of the Gulf. The Bay provides protected fresh water anchorage for boats with quality marinas, motels, hotels and restaurants ashore.

A technical appraisal of the pollution and weed growth problems of the area is given in the attached Report of Citrus County Aquatic Weed Committee as made October, 1967, to the Citrus County Board of Commissioners. Noteworthy is the technical data limited to experiments with such chemicals as copper sulphate and with concentrated sulphuric acid. The use of cutting and gathering machines has been tried with poor results.

We now find motels and hotels reporting constant complaints from visitors, to wit- "We are not coming back until those weeds are under control". The residents of the area are at last thoroughly aroused and are making a concerted effort to attack conditions through a non-profit, chartered organization called, "WAR ON WEEDS SOCIETY, INCORPORATED". The goal is a membership of 1000 households. In addition to private contributions, massive aid will be solicited at County, State, and Federal levels.

The immediate problem is the control of the weeds Elodea and Milfoil now enhanced by pollutants such as raw sewage, silt, and weed residues. Recommendations are:

1. Stop the dumping of raw sewage into the bay and river.
2. Control silting by legislation that prohibits the digging of open end canals, i.e., dig blind and allow settling before unplugging.
3. Investigate and place into practice proper methods for aquatic weed control.

Yours very truly,

W. Barnes

W. L. Barnes, President

ATTACHMENTS - 4

1. Map of West Citrus County
2. Brochure - Welcome to the Suncoast Springs Area
3. Citrus County Aquatic Weed Committee Report October 19, 1967
4. Final Report on the Use of Concentrated Sulphuric Acid for the Control of Elodea- C. L. Phillippy, Fishery Biologist, Lakeland, Florida

wlb/eab

Charles D. Schilling

WRITER • PHOTOGRAPHER • OUTDOOR COLUMNIST

AREA CODE 305 - PHONE 287-2027 - P. O. BOX 2226 - JENSEN BEACH, FLORIDA 33457

March 7, 1968

Mr. John R. Thoman, Regional Director
U.S. Dept. of the Interior
Federal Water Pollution Control Administration
Southeast Region, Suite 300
1421 Peachtree St. N.E.
Atlanta, Ga. 30309

Dear Mr. Thoman:

I've just returned home to find your invitation to the Orlando Pollution Forum to be held in Orlando March 12 and 13. I deeply appreciate the opportunity this affords, but I must regretfully inform you that I will be out of the State of Florida on those dates and cannot possibly attend.

I hope you will convey my regrets and appreciation to both Governor Kirk and Nathaniel Reed for thinking of me in this connection, as my interest is deep and abiding.

The problems and sollutions to Florida pollution are, of course, varied and complex, but certainly foremost in the estuarine pollution problem are the U.S. Army Engineers and the Florida Flood Control Commission. Even clean fresh water, when dumped indiscriminately into estuarine areas upsets the delicate saline balance which, in turn, is harmful to the entire ecology which is so important, and when the water being dumped is, in addition, heavily silt and mud laden, the problem becomes much more serious.

I have long felt that the primary need in Florida for a lessening of its pollution problem is a complete re-evaluation of the Congressional Act that created the Florida Flood Control Commission and the U.S. Engineer project. As you probably know, this Bill was enacted in a climate of hysteria and did not have the benefit of reasonable study and debate. Its guide lines were poorly defined then and are certainly no longer close to being valid in conditions which Florida is in today. I feel that this huge water management project will never realize its potential for good until it is resubmitted and reactivated on a basis consistent with present knowledge and fact. Had I been able to attend, this would have been my theme, and I'm hopeful that someone else will recognize the problem as so stated.

With kindest regards, I am,

Sincerely Yours,

Charles D. Schilling

CDS/h

Pollution Problems in the Nation's Estuaries

W. K. Robertson[1]

It is a pleasure for me to make a statement on pollution of estuaries from the standpoint of a soil chemist. Water movement into the estuaries from the surrounding soil is probably a source of pollution. The magnitude of this source of pollution in relation to others, however, is another story. Its actual effect on the estuarine habitat is the element of most concern; no doubt in most instances pollution from soil remains a part of a natural phenomena that has been going on for eons of time.

The water flowing into the estuaries comes from either surface runoff or ground water movement. Of the two sources ground water makes practically no contributions to the pollution. The water moves under anaerobic or reducing conditions. Most soluble nutrients from fertilizers are either lost in gasious form or fixed in the soil. Nitrate is reduced to nitrogen gas. Sulfur, often found in subsoil, is reduced to gydrogen sulfide gas or insoluble iron sulfides. Phosphate is converted to almost insoluble forms with iron and aluminum. The sodium and potassium that may be present from fertilizer is insignificant as compared to that normally in brackish water. Surface runoff from upland soil is probably negligible except possibly at very intense rainfall. Then the major source of runoff is from flatweeds or lowlands. This water contains clay sediments and organic residues (seeds and plant decomposition products); the amount depends on the soil type in the area. If agriculture makes any contributions to pollution it would be from cropped flatwood areas that have improved drainage facilities. In periods of heavy rainfall water flowing off this soil could contain nitrates, phosphates, potassium, and sodium. Since the micronutrients sometimes applied in fertilizers are at low levels and often only slightly soluble they probably can be ignored.

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[1] Fellow, American Institute of Chemists, Florida Chapter. Present address: Soils Department, Florida Agricultural Experiment Stations, University of Florida, Gainesville.

The economics of producing crops that require large amounts of fertilizer is such that growers use practices that reduce, if not eliminate, losses from surface runoff. Some of these practices include split application such that fertilizer is present only when the plant needs it and there is no large amount in the soil at any one time; the use of plant nutrients coated to reduce solubility; fertilizer placement in the root zone beneath the surface of the soil so that it is not readily dissolved in surface runoff, and finally effective spreading by plane of pesticides in concentrated forms with sticking agents so that they fall on the plant and only small amounts, if any, reach the soil.

The most important consideration is a guarantee that research on possible sources of agricultural pollution continues in order to insure that pollution levels are well within safe limits. We are extremely fortunate in the fact that the soil, in itself, is a wonderful "disposal unit"; it functions on physical, chemical and microbiological principles and each mechanism plays its part in ultimately reducing all contaminants to harmless or elemental forms.

The Florida Federation of Women's Clubs

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1966–1968

STATEMENT OF FLORIDA FEDERATION OF WOMEN'S CLUBS TO NATIONAL ESTUARINE POLLUTION STUDY, PUBLIC MEETING, MARCH 12-13, 1968, ORLANDO, FLORIDA

Through countless ages the waters of Lake Okeechobee in southern Florida flowed gently southward through the everglades into Florida Bay. The broad, shallow Everglades River supported marine life, plant life and wildlife in great abundance, ending in a rich estuary.

The Everglades National Park was established in 1947 to save this unique natural environment for the people of the nation to see, use and enjoy.

The U. S. Army Corps of Engineers made a survey on flood control around Lake Okeechobee, drafted plans and started construction of a flood control project about the time the park was established.

Water needs of the park were not considered. Eventually the flood control project cut off all water from Lake Okeechobee to Everglades River at the northern boundary of Everglades National Park.

Cutting off the flow of fresh water into the Everglades River estuary increased the salinity with adverse effect on marine life. When floods threatened, great quanities of fresh water pumped into St. Lucie Canal and Caloosahatchee River were discharged into estuarine waters of the Atlantic Ocean and Gulf of Mexico, reducing salinity with harmful effect on marine life.

National and state conservation organizations and countless individuals created tremendous public pressure over many years trying to influence the Corps of Engineers and the Central and Southern Florida Flood Control District to share water with the park.

At long last, a survey was authorized, but while this was in progress, a drought added to the water problem of the park. The President of the United States offered a supplement to the budget to bring a limited emergency supply of water to the park.

Completion of the survey brought recommendations for a $69 million water management project, since upped to $76 million, which would store water instead of discharging it into the Ocean and Gulf, providing more water for all users.

Since the Sumerians dug the first canals for drainage and irrigation of crops in the marshes of the lower reaches of the Tigris and Euphrates Rivers more than 8000 years ago, man's habit in dealing with wetlands has not changed. These lands are looked upon as worthless unless converted to other uses. Habit man has formed man can change, but habit of long duration is not easily changed. Tremendous effort in education is required, but even our leaders in education and government do not see the need for education. We point out that the need for education is missing from the Frame of Reference in this National Estuarine Pollution Study.

At least two agencies in Florida with some influence on estuaries need more conservation awareness, Trustees of the Internal Improvement Fund and the Central and Southern Florida Flood Control District.

The very existence of IIF invites land development in submerged lands. This agency has its roots in pioneer times when the state had a great deal of land to sell. Most of the lands left are submerged lands which should be kept and carefully managed as valuable natural resources. Florida, no longer being a pioneer state, should dissolve IIF or completely reorient it from land sales to conservation management of the submerged lands.

Through the appointment of a conservation minded individual to the Board of Directors of the Central and Southern Florida Flood Control District, Governor Claude R. Kirk, Jr., created a favorable climate for conservation within the state agency which operates the flood control project for the Corps of Engineers. Before the Governor's appointment, the FCD Board opposed sharing water with the park. Now FCD is promoting recreation and beautification within this 18 county project. FCD may even become dedicated to conservation some day.

The U. S. Department of Defense is a war machine more geared to destruction than conservation. The U. S. Army Corps of Engineers is part of the Department of Defense. We need to consider whether management of estuaries and other water resources should be a civilian operation, rather than military. Intensive effort should be made to buildup in-service conservation education of personnel and to bring in more persons experienced in conservation into the U. S. Army Corps of Engineers.

To summerize briefly, there is need for more public education on the value of estuaries, and for a hard look at government agencies having to do with management of estuaries to the end that these be made more conservation conscious and more people oriented.

Statement by: Evelyn Waybright

Mrs. Roger J. Waybright, Chairman
Conservation of Natural Resources Department
Florida Federation of Women's Clubs
806 South Shores Road
Jacksonville, Florida 32207
March 22, 1968

ENGINEERING-SCIENCE, INC.

150 EAST FOOTHILL BOULEVARD · ARCADIA, CALIFORNIA 91006 · 213/359-9381

CABLE ADDRESS: ENGSCI

Rio de Janeiro,
19 February 1968

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Sir:

In accordance with the invitation extended by Mr. John R. Thoman in his letter to me dated 9 February, I am writing to submit comments for the record for the public meeting on estuarine water resources to be held at Orlando, Florida on 12-13 March. It is my hope to be able to complete my current trip to South America in time to make my presentation personally at the meeting; however, this statement is presented for the record of the meeting whether or not I am able to attend.

A main point of my comment is that the FWPCA, is working with the States to establish standards for control of estuarine and coastal waters, give due consideration and recognition of the fact that the technology of waste treatment and pollution control is rapidly changing, largely stemming from FWPCA's efforts in sponsoring a national research and development program over the past several years, which program is serving to produce scientific facts so that it is becoming possible to upgrade understanding of the basic phenomena involved, to put the whole field on a much move scientific basis than has been possible in the past. Actually many of the conventional concepts of waste treatment and pollution control, having been developed in the "pre-science" era, are obsolete and at this stage need to be reappraised and in some instances abandoned rather than to be incorporated into the new standards.

For example, consider the traditional concept of"primary treatment" as a necessary "first level" to be required by regulatory control. Primary treatment served a valuable role in earlier years, by helping to reduce or eliminate sludge banks and scum accumulations in streams.

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Viewed in terms of the present situation, however, the value of primary treatment can be seriously questioned in many instances in that such treatment results in production of digested sludge which often in itself presents a new disposal problem, and in a highly concentrated "supernatant" containing nutrients and "biostimulants" in concentrated form, which is then returned to the system one way or another so these biostimulants are not in effect removed by the primary treatment process to any very significant degree. Considering the very significant role of biostimulants on the dissolved oxygen balance and on the ecology of "confined" receiving waters (including rivers, estuaries, and all receiving waters other than open coastal marine waters), it becomes apparent that the validity of the concept of primary treatment (as something to be required as a first-level degree of treatment) may be questionable in many instances and instead may be eliminated in favor of a design where aerobic stabilization processing is used from the outset.

Secondary treatment processing, also, needs to be reassessed, in terms of scientific evidences (beginning to appear) than the content of biostimulants in the effluent may be a highly significant factor, in addition to BOD, in affecting critical oxygen balances in confined receiving waters. In most "downstream" oxygen balance situations, there is some critical zone (for example, in an estuary, in the zone before much tidal flushing occurs), and the adverse effects of a waste of given BOD concentration can be significantly reduced with a lower level of biostimulation. Hence attention needs to be given to the type of secondary treatment used, as well as to levels of BOD reduction to be attained, to reduce biostimulants as much as possible. This means favoring "higher-rate" aeration systems over "lower rate" systems. The current FWPCA Demonstration Grant project at Chino, California, for example, features an "accelerated high rate" activated sludge process which reduces aeration times to less than one hour (as compared to 3 to 5 hours for conventional "high-rate" processes). The effects of these factors in influencing treatment plant design is illustrated in a current report being prepared by Engineering-Science, Inc. for the Washington Suburban Sanitary District (Hyattsville, Maryland) dealing with expansion of the District's Parkway Sewage Treatment Plant.

A second main point of this presentation is that, because of the significance of such factors as biostimulation and toxicity as well as the conventional parameters (BOD, DO, pH, suspended solids, etc.), the most important criteria in establishing control standards for confined receiving waters are indicated to be criteria designed to preserve the natural ecology of the receiving water, for example, a biological diversity index, a primary productivity index, and some type of advanced (meaningful) bioassay procedure for evaluating the accumulative toxic effects of relatively low levels of pollutants.

Again, the concepts of conventional primary and secondary treatment may not have much meaning in this respect and hence ought not to be arbitrarily incorporated into regulatory requirements. An illustration of this point is the current State of California's San Francisco Bay-Delta Project (a $2.8 million study for preparing a master plan of pollution control for the Bay-Delta region, in which our company is heavily involved), where it appears that these new parameters (rather than traditional concepts) will be controlling in developing the recommended regional solution.

The above discussion is background for my third main point, namely, in establishing standards for disposal to unconfined marine (coastal) waters, that the regulations again be realistic in terms of the scientific and economic facts. Considering first the scientific situation, the studies accomplished thus far show that the design of most waste treatment systems discharging to unconfined marine waters, and the associated regulatory requirements, are more or less copied from conventional technology related to discharge to confined receiving waters and hence make little sense (resulting in heavy wastage of public funds). Our own work (see publications by the staff of Engineering-Science, Inc. presented at the London Conference of the International Water Pollution Research Association in 1962) was the first to indicate that, in order to have an effective disposal system handling large flows discharged to coastal waters, an extensive submarine outfall is required, and, given this, that the only really significant parameter is that of floatables (and that attention to BOD, settleable solids, pH, etc.) is almost meaningless. In follow-up work our efforts have focused attention both on developing analytical techniques for quantitating floatables (see our presentation at the Munich International Water Pollution Research Conference), and on improving treatment plant design technology to suit the specific needs for discharge to unconfined marine waters as compared to confined waters.

As noted above, given a submarine outfall extending offshore sufficiently beyond the near-shore zone of water to be protected, the only really significant component of the effluent, so far as its organic content is concerned, is the floatables fraction - these rise to and persist at the surface, and eventually reach the shore or near-shore zone of waters. The settleable solids sink to the bottom where they are stabilized and gradually work seaward (ending up in ocean canyons). The dispersed organic matter is readily oxidized, and the ocean oxygen supply is so great appears to be able to handle very high BOD levels as easily as low levels. Hence it is seen that the traditional design concepts of primary and secondary treatment, which were developed with inland disposal in mind, have no particular validity for discharges to coastal waters. An ideal design for such situations would be one which removes only the floatables.

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With respect to primary treatment as applied to coastal water discharges, it should be recognized that conventional primary treatment, while focusing attention on sludge removal and digestion, gives very limited attention to removal of floatables. Studies carried out by Engineering-Science, Inc. for the U.S. Public Health Service Division of Water Supply and Pollution Control, and later for the FWPCA, indicate a superior design for a primary level of treatment (called "marine primary treatment") would focus attention on removal of floatables without concern to removal of settleable solids or BOD - for the same level of investment the "marine primary treatment" would provide significantly better protection than conventional primary treatment or provide the same level of protection at less cost.

A final point is to note, where the alternative of discharge to unconfined marine waters is being compared to discharge to any confined waters, including estuaries, that for any degree of protection to be provided for conserving wildlife, this degree can be achieved for more economically by discharge to the unconfined waters rather than to confined waters, or, for any level of investment, the resulting alterations in the natural ecology (and the associated harmful effects on wildlife) will be far less with discharge to unconfined marine waters, because of the relatively huge volume of diluting water available. In a recent report prepared by Engineering Science, Inc. on sewage disposal for the metropolitan area of San Juan, Puerto Rico, it was concluded that the best plan by far is to abandon disposal to San Juan Bay in favor of discharge to the coastal waters, and that such discharge to the unconfined waters, with preliminary processing by "marine primary treatment", provides an economical solution with minimum alteration of the regional ecology.

To sum up, in the establishment of criteria or standards for governing discharges to unconfined marine waters, it is important that these not be "copied" from inland disposal concepts, inadvertently resulting in "forcing" the choice of inland disposal over coastal disposal and resulting in very significant losses in public funds and/or in natural ecologycal resources.

Sincerely,

Harvey F Ludwig
Harvey F. Ludwig
President
Engineering-Science, Inc.

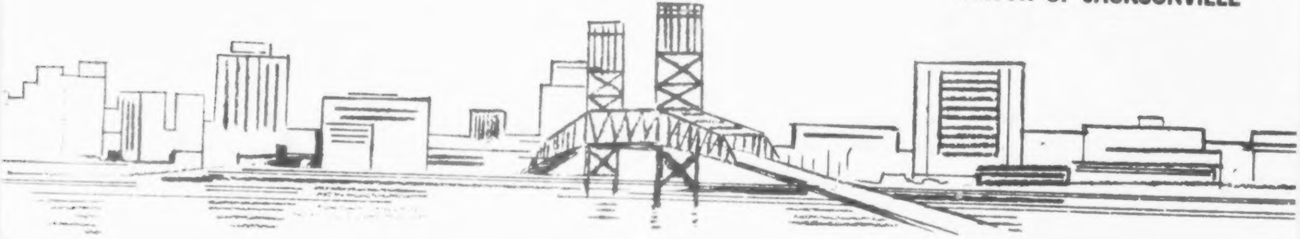
cc: Mr. Orlando Gonzales (San Juan)
Mr. Gordon McCallum
Dr. Leon Weinberger

NOVEMBER 17, 1966
JACKSONVILLE, FLORIDA

REPORT

CITIZENS ADVISORY COMMITTEE FOR WATER POLLUTION CONTROL

AS APPOINTED BY THE
MAYOR OF JACKSONVILLE



MAYOR'S ADVISORY COMMITTEE FOR WATER POLLUTION CONTROL

Committee Officers

Sanford A. Mullen, M. D. (Physician), chairman
Harry Richards James (Insuror), vice-chairman
C. Howard Hill (Jacksonville Area Chamber of Commerce), executive secretary
W. David Coyner (Florida Medical Association), executive secretary
Miss Cheryl E. Crawford, secretary to executive committee.

Executive Committee

Sanford A. Mullen, M. D.
Harry Richards James
C. Howard Hill
W. David Coyner
Claude Smith, Jr., chairman, Elected Officials Sub-Committee
David B. Lee, chairman, Technical Advisors Sub-Committee
James H. Coppedge, Sr., chairman, Industrial Consultants Sub-Committee
Crawford Solomon, chairman, Public Information Sub-Committee
LeRoy Gardner, chairman, Budget and Finance Sub-Committee
Frank H. Brownett, chairman, Program Sub-Committee
Mrs. Elliott J. Roschuni, chairman, Rules Sub-Committee

Committee Members and Sub-Committee Assignments

Elected Officials

Claude Smith, Jr., City Commissioner
Henry T. Broadstreet, City Commissioner
Richard B. Burroughs, Jr., City Councilman
W. Lem Merrett, County Commissioner

Technical Advisors

David B. Lee, Director, Bureau of Sanitary Engineering, Florida State Board of Health
Thomas B. Ard, Assistant Sanitary Engineer, City Board of Health
E. E. Bentley, City Engineer
W. B. Copeland, Chairman, Florida Game and Fresh Water Fish Commission
John H. Crosby, Duval County Engineer
Walter G. Daniel, Engineer-Consultant, City of Jacksonville
William K. Jackson, Chairman, Jacksonville-Duval Area Planning Board
E. R. Smith, M.D., City Health Officer
B. F. Thomson, Member, Jacksonville-Duval Area Planning Board
Leo M. Wachtel, M. D., Physician, Member, Florida State Board of Health
James Watson, Duval County Agricultural Agent

Industrial Consultants

James H. Coppedge, Sr., J. H. Coppedge and Company
Edward L. Blair, Plumbers and Steamfitters Local No. 234
Bill L. Bryant, Fred Wilson and Associates
Gaston L. Dickens, The Glidden Company
Ira McK. Koger, O. P. Woodcock Company
Donald T. Martin, Atlantic Coast Line Railroad

Public Information

Crawford Solomon, Convention Press
Harold S. Cohn, Sr., WRHC Radio
Jesse H. Cripe, WFGA-TV
Robert R. Feagin, Florida Publishing Company
Larry Richardson, WJXT

Budget and Finance

LeRoy Gardner, Banker
Henry Bachara, Home Builders Association
Wilson Baker, Oil Dealer
Mrs. Harry M. Eubanks, President, District 2, Florida State Nurses Association
Miller Gaskin, Real Estate Broker
Charles L. Hoffman, Banker
Irving Klepper, Insuror
Howard E. McVeigh, President, Woodstock Park Civic Club

Program

Frank H. Brownett, Contractor
Nathaniel C. Dudley, Real Estate Broker
Norman R. Dunn, Izaak Walton League of America
Randy R. Kroner, Jacksonville Area Junior Chamber of Commerce
Harry A. Pierce, Jr., Izaak Walton League of America
Dr. S. B. Schumacher, Retired Optometrist
Waddell A. Wallace, Equipment Dealer

Rules

Mrs. Elliott J. Roschuni, President, Garden Club of Jacksonville
Leon F. Bland, Funeral Director
Mrs. Harold R. Clark, Woman's Club of South Jacksonville
William Dorsey, Jacksonville Terminal
Mrs. R. L. Miller, League of Women Voters
Rev. James B. Orth, Minister
W. T. Stockton, Jr., Attorney
D. A. Watts, Jacksonville Port Authority
Commander E. S. Welch, MC USN, U. S. Naval Air Station, Jacksonville

REPORT

MAYOR'S ADVISORY COMMITTEE FOR WATER POLLUTION CONTROL

Introduction

On September 8, 1965, Mayor Louis H. Ritter of Jacksonville, Florida, appointed a Citizens Advisory Committee for Water Pollution Control. This committee was formed by the Mayor because of the increasing awareness in the citizens of the area that a serious problem of water pollution existed in the Jacksonville area. Local people were becoming more outspoken in their desire to clean up the waters of the area. The Public Health Committee of the Jacksonville Area Chamber of Commerce had been particularly active in urging Mayor Ritter to form such a committee. This advisory committee was charged with the responsibility of studying the problems and making recommendations which would lead to the control of water pollution in the St. Johns River and its tributaries in the Jacksonville area.

Mayor Ritter appointed a total of 55 outstanding citizens to the committee. Included in the group were leaders in all phases of community life. Officials from both city and county government and industrial leaders were named, together with representatives of news media as well as representatives of civic organizations. The committee was organized into a total of seven sub-committees, for the purpose of studying various aspects of the problem. The sub-committees included those made up of elected officials and technical advisors. The technical advisors sub-committee was made up of representatives of the State Board of Health and city and county governmental employees concerned with sanitation, as well as members of the Area Planning Board and the Florida Game and Fresh Water Fish Commission.

A group of industrial consultants, representing some of the larger companies in the area, were made members of one of the sub-committees. Public information and budget and finance sub-committees were established. The organizational structure of the master committee was completed with a program sub-committee and a rules sub-committee. For the purpose of coordinating all sub-committee activities, and to provide leadership for the master committee, an executive committee composed of the officers and chairmen of each of the sub-committees was established.

During the course of the year, the committee had multiple meetings. These meetings were basically designed to provide information to the committee, and to present various aspects of the problem to the community as a whole. There were many excellent presentations from key officials of city, county and state governmental agencies. Comments were voiced by industrial leaders and many other interested citizens. In addition to the meetings of the entire committee, there were many meetings of the various sub-committees and the executive committee. The public program of the committee was climaxed on April 1, 1966, at which time an open meeting for all interested citizens in the area was held. This proved to be quite successful and resulted in widespread community interest in the activities of the committee. The news media did much to publicize and report this meeting. Following the open meeting, the committee began drafting its report. This report is the culmination of the activities of the committee, and is presented as the basis of a reasonable method of bringing about the control of pollution in the St. Johns River and its tributaries in the area of Jacksonville, Florida.

Historic Background

One of the greatest natural resources in northeast Florida is the St. Johns River and its many tributaries. It was because of the St. Johns River that the settlement of Cow Ford was originally established and came to flourish, with its name being changed to Jacksonville in 1822. This magnificent river has enabled Jacksonville to become one of the leading seaports of the eastern coast of the United States. Because of this river, Jacksonville has developed a large complex of private shipping interests, as well as a vast naval establishment. The river has been widely used for other commercial enterprises and for recreational purposes.

In the past, all types of wastes were dumped indiscriminately into the St. Johns River and its major tributaries in the Jacksonville area, without any thought as to the effect on the river system. Much as inhabitants of other areas stripped their forests bare and left behind empty plains, so was the unrestricted pollution of the river allowed to continue. In 1877, twelve years after the municipality of Jacksonville was chartered, there was a bond issue of $250,000 provided to establish "perfect drainage, sewerage — and to secure a system of water supply". It was in 1879 that sewers were first placed in Jacksonville. From that time, there has been a continuing development of sewers in the area. Until 1955, the sewers were all designed to dump into the local tributaries of the St. Johns River, or directly into the great river itself.

As World War II was ending, the Florida State Board of Health, in cooperation with city officials of Jacksonville, and with technical assistance from the United States Public Health Service, made an extensive pollution study of the St. Johns River and its tributaries in the Jacksonville area. Soon thereafter, interested city officials and private citizens began to show an active concern about the obvious water pollution that was taking place. On December 1, 1953, the City of Jacksonville entered into an agreement with the nationally-known engineering firm of Metcalf and Eddy of Boston, Massachusetts, and the Jacksonville firm of Reynolds, Smith and Hills, to make a study and present the City of Jacksonville with a master plan for sanitary sewerage and storm drainage. On September 28, 1955, the final report of Metcalf and Eddy was submitted to, and accepted by, the City Commission of the City of Jacksonville.

The Metcalf and Eddy report outlined a master plan for sanitary sewerage and storm drainage. The entire plan projected four stages of development, and was estimated to have a cost of $160 million, of which slightly over two-thirds of the entire sum was to be devoted to sewerage projects. The first stage of this program, which had been planned to cost $23,672,000, was completed in 1961, although the actual expenditure was reduced to a total of $17 million, which was financed through utility tax revenue bonds. This cost included $15 million for sewerage facilities and $2 million for new storm drainage construction. Since that time, there has been no additional implementation of the master plan. The first stage of the master plan has indeed prevented, to some degree, further pollution of the river; but it is inadequate to serve the expanding community which has been growing rapidly, both industrially and residentially. Several Jacksonville tributaries of the St. Johns River, such as McCoys Creek and Hogans Creek, have become grossly polluted to an extreme degree.

Current Situation

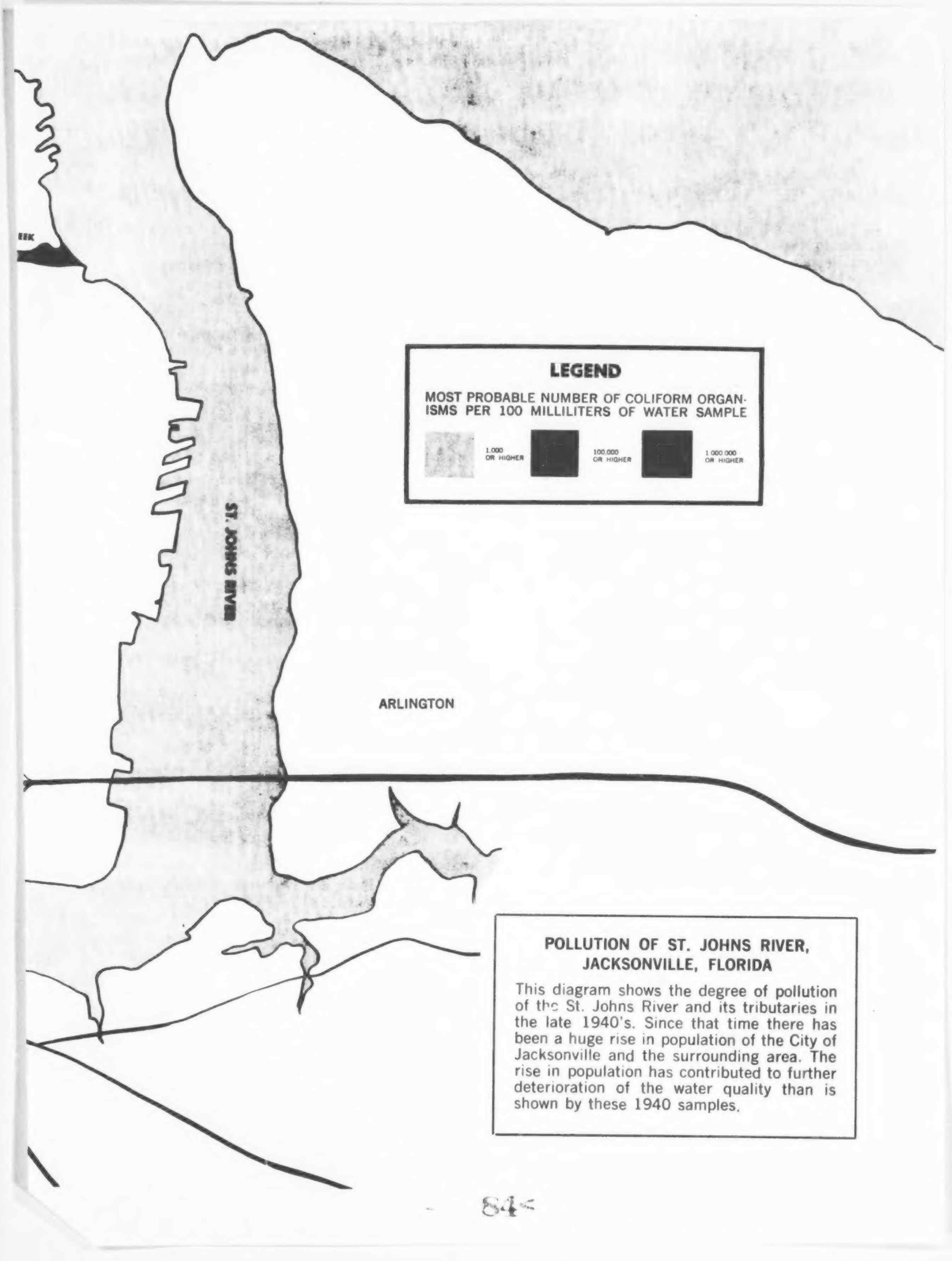
The local problem has been made even more acute by the national publicity given to pollution of all types. Local citizens have become greatly disturbed by the awesome example of the desperate situation in New York City, which has developed an acute water shortage, in spite of the fact that the city is surrounded by major bodies of water. Citizens of the Jacksonville area have become aware that the Hudson River, as it flows past New York City, has been classified as an open sewer, and is not used as a source of water. Although the St. Johns River is not grossly polluted in all areas within Duval County, there are many parts of the river which have become a veritable open sewer. This reaches its greatest intensity at the entrance of the tributaries such as McCoys Creek and Hogans Creek, and also at many of the sewer outfalls. The seriously polluted condition of the river becomes obvious when it is pointed out that all public health officials and physicians advise strongly against any swimming, and limit other aquatic sports, in the St. Johns River.

Florida as a state has been doing a good job in water pollution control. It has been listed by the Federal Water Pollution Control Administration as being one of the top seven states in the nation in the expenditure of funds for this purpose. Jacksonville is now causing the greatest amount of pollution of any community in the state of Florida. According to figures from the Florida State Board of Health there are a total of approximately 17 million gallons of raw sewage dumped into the streams of Florida every day. Of this amount of sewage, approximately 15 million gallons per day go into the streams and rivers of Duval County. This means that a total of approximately 90% of all raw sewage in the state of Florida flows into the streams of the Jacksonville area. It is of particular interest to realize that about 85% of this 90% goes into the streams within the city limits. These figures mean that a total of approximately 75% of all raw sewage going into the streams of Florida originates within the city limits of Jacksonville. Another way to document the problem is to point out that approximately 475 million gallons of treated effluent per day are discharged into the water of Florida, but that only 5 to 6 million gallons per day of treated sewage are from the Jacksonville area. It should be pointed out that approximately one-half of the raw sewage in the Jacksonville-Duval area is of residential origin, and approximately one-half is industrial origin.

The great increase in population of Duval County has contributed to this problem. In 1965, an estimated total of 511,000 people lived within the county limits; an increase of 40.5% over a fifteen year period. The population growth has largely been met in the county area outside of the city limits by a constantly-growing program of waste treatment plants in the major subdivisions. In contrast to this, the population and industrial increases within the city limits have not been followed by an increase in waste collection and treatment, with the exception of the implementation of the first phase of the 1955 Metcalf and Eddy report.

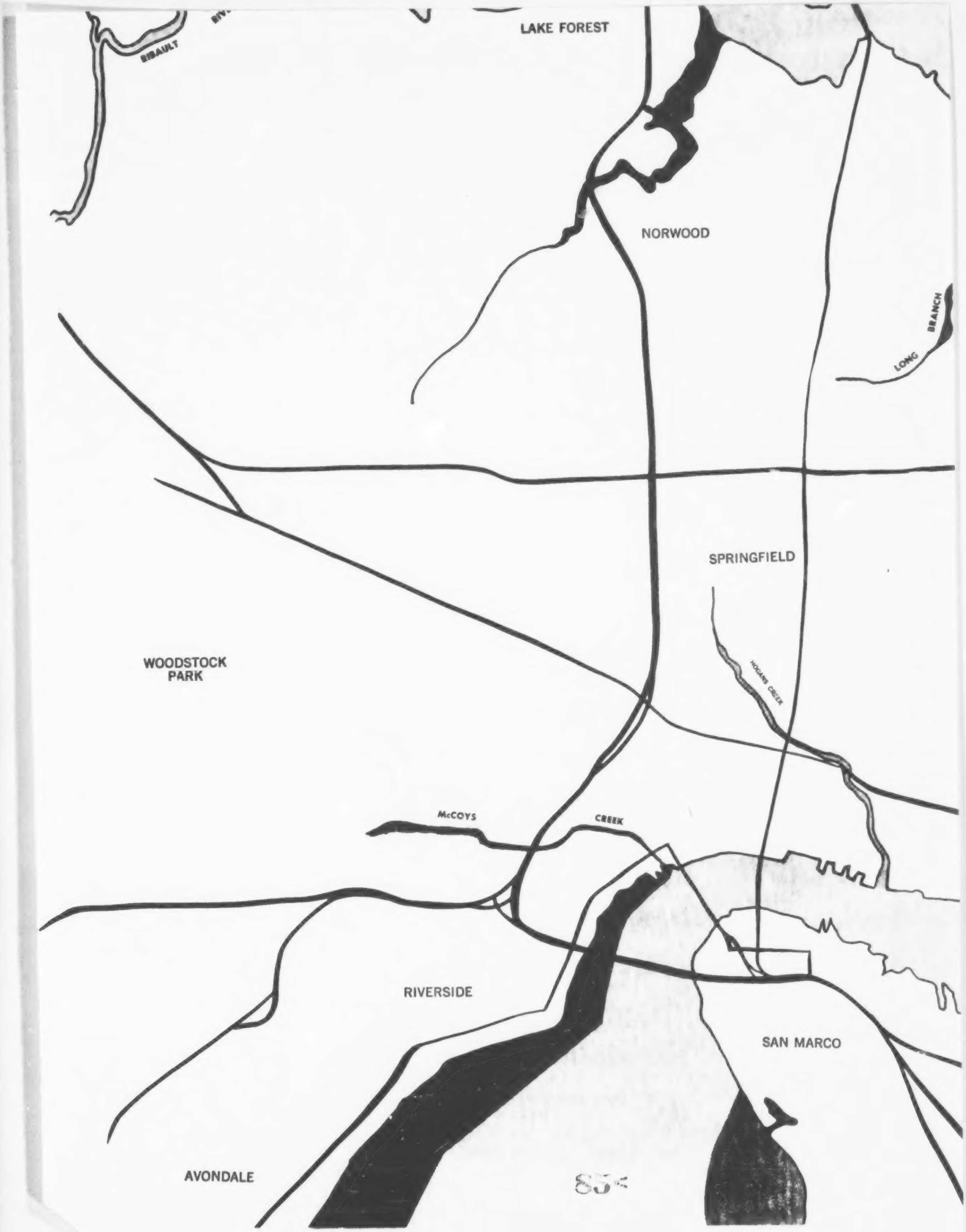
The Duval County population of 511,000 is broken down into a rural population of 75,500, plus an urban population of 435,500. The rural population is served by septic tanks or less. It is estimated that there are 37,000 people living in the urban areas who are also served by septic tanks or less, giving us a total of 112,500 people without sewers. Of the urban population, 398,500 people are served by sewers.

In 1961, the City of Jacksonville constructed a sewage treatment plant designed to serve a maximum of 80,000 people. At the present time there are


EEK
ST. JOHNS RIVER
ARLINGTON
LEGEND
MOST PROBABLE NUMBER OF COLIFORM ORGANISMS PER 100 MILLILITERS OF WATER SAMPLE
1,000 OR HIGHER
100,000 OR HIGHER
1,000,000 OR HIGHER

POLLUTION OF ST. JOHNS RIVER, JACKSONVILLE, FLORIDA

This diagram shows the degree of pollution of the St. Johns River and its tributaries in the late 1940's. Since that time there has been a huge rise in population of the City of Jacksonville and the surrounding area. The rise in population has contributed to further deterioration of the water quality than is shown by these 1940 samples.


RIBAULT
RIV
LAKE FOREST
NORWOOD
LONG BRANCH
SPRINGFIELD
HOGANS CREEK
WOODSTOCK PARK
McCOYS CREEK
RIVERSIDE
SAN MARCO
AVONDALE

39,000 people being served by this facility. In addition to this, the City of Jacksonville has 4,100 persons served by septic tanks or less, and 155,000 persons discharging raw sewage into the St. Johns River through the city sewer system.

The remainder of Duval County has 109,000 persons served by septic tanks or less, and 205,000 persons served by sewers discharged directly into the St. Johns River, or through waste treatment plants with varying degrees of treatment. The State Board of Health records indicate that a total of 398,500 people in Duval County are served by sewer systems, including approximately 250,000 people being served by sewage treatment plants.

In spite of the fact that Duval County is presently leading the State in the number of sewage treatment plants constructed, it has not kept up with the requirements for proper operation and maintenance of the plants. In a report made to the Board of County Commissioners by the Duval County Health Department, one paragraph states:

> "22 municipal-type sewage systems serving subdivisions were visited during the survey. 12 of these were septic, and offensive to the sense of smell. 2 plants were by-passing the treatment facilities, and the remaining 8 plants, which were enclosed with an 8' fence, were locked, and the sanitarian was unable to gain entrance to the plant."

An act entitled "Duval County Water and Sanitary Sewerage Authority Act" was passed by the 1959 State Legislature. This provides a mechanism by which adequate water and sewerage could be provided outside the incorporated cities and towns in Duval County. In 1955, the Florida State Legislature passed a local act to establish a mechanism by which the City of Jacksonville could develop an adequate sewer system, and provided a means for the financing of the program. These laws are discussed in detail later in this report.

In addition to the domestic waste problem, there are industrial waste problems which are a direct result of industrial plants located in urban Duval County. Many of the industries are working diligently toward adequate treatment of their waste, but there is a large volume of partially-treated and untreated waste discharged daily into the local creeks and rivers. Industrial plants discharge waste water that places a pollution load on the St. Johns River with a population equivalent that exceeds the total population of the City of Jacksonville.

The problems of pollution of the surface waters can be solved by the design, construction and proper operation of collection systems and waste water treatment plants, for domestic sewage and industrial wastes, that are capable of providing an effluent that would not degrade surface waters.

When it is realized that Duval County (particularly the City of Jacksonville) is the principal area contributing to the pollution of the waters of the entire state of Florida, it becomes apparent that it is absolutely essential to begin a strong, determined and effective local program, designed to control water pollution in the Jacksonville-Duval area. Cooperation with regional and state organizations concerned with the problem of water pollution is advisable and desirable, but the local program should not be delayed in order to wait for the development of some other plan at the regional or state level.

City Program

A three-phase program for the control of the pollution of the Jacksonville streams has been developed by the City of Jacksonville. The program is in compliance with the recommendations of the Florida State Board of Health. Phases I and II are primarily intended to lead to the removal of pollution from the major tributaries running through the City of Jacksonville. Phase III is for the completion of the removal of pollution from the tributaries and elimination of raw sewage going into the St. Johns River. The program is outlined as follows:

Project		*Estimated Cost*
	Phase I	
Project 1-A	Almeda Division Street Trunk Sewer	$ 335,000
Project 1-B	Westbrook Force Main	130,000
Project 2-A	Rebuilding Westbrook Lift Station	265,000
Project 2-B	McCoys Boulevard Interceptor Force Main and Lift Station	260,000
Project 3	North Willowbranch Trunk Sewer and Lift Station	520,000
Project 4	South Willowbranch Trunk Sewer and Lift Station Connection	125,000
	Sub-total	$1,635,000
	Phase II	
Project 9	Hogans Creek Relief	$ 300,000
Project 8	Smith Branch Interceptor	112,000
Project 5	Mayflower Trunk Relief	574,000
	Sub-total	$ 986,000
	Phase III	
Project 6	Nelson Avenue Area	To Be Estimated
Project 7	Lenox-Highway Avenue Area	To Be Estimated
Project 10	St. Johns River Trunk Sewer	To Be Estimated
Project 11	South Jacksonville Trunk Sewer	To Be Estimated

Phase I is now in the stage of final plans and specifications. Plans and specifications for Projects 1-A and 1-B are ready to be submitted to the Florida State Board of Health for approval. 2-A plans are also ready for the State Board of Health. 2-B plans are in the State Board of Health and have been approved. Project 3 plans are approximately 70% completed, while Project 4 plans are approximately 25% completed. An application for construction of the sewers of Phase I was prepared, properly endorsed and forwarded to the Department of Housing and Urban Development for a construction grant of 50% under Section 702 of Public Law 89-117.

On August 4, 1966, it was announced by the White House that this application had received favorable consideration, and the City was advised by its Congressman and U. S. Senators that $672,000 had been reserved for the construction of Phase I. This sum, together with Federal Water Pollution Control Administration money and city funds, provides for complete financing of this phase of the program. It has been estimated that with the completion of the construction of the six projects in Phase I, approximately 3.75 million gallons of raw sewage per day will be removed from the tributaries that flow into the St. Johns River.

The application for planning funds for Phase II has been approved, and $66,608 has been allotted by the Department of Housing and Urban Development for this purpose. The application for planning funds for Phase III of the program is in process. The Phase III projects, consisting of major trunk sewer lines along the north and south sides of the St. Johns River will, when completed, remove from the river raw sewage in excess of 15 million gallons per day. It should be pointed out that this program will not take care of many of the major industrial plants which emit pollutants in Duval County. These plants dump pollutants into the streams of the area to a great extent, estimated at a population equivalent of 200,000. This problem must not be neglected.

Laws Governing Water Pollution Control

Over the years, many local and state laws have been enacted for the purpose of controlling water pollution in the Jacksonville area. These laws relate both to the methods of financing sewer programs and to the establishment of legal means of preventing water pollution, and enforcing laws concerned with this problem.

City of Jacksonville

1. Sewer Utilization (Chapter 34, City Ordinance Code)

The City of Jacksonville has a comprehensive ordinance covering sewer utilization and water pollution. This was approved in final form by the City Commission on April 18, 1961, and gives the City the authority to determine the type of sewage which can be discharged into the city system. The City also has the authority to require pre-treatment of sewage, whenever this is deemed necessary to prevent damage to the system.

This Ordinance makes it illegal for any sewage to be discharged into any natural outlet without proper treatment. This law further provides for the standards of operation of private sewerage systems and spells out in detail the means of operation of the city system. Enforcement of this Ordinance and penalties for violation are established in this law.

2. Financing of Sewerage System. (Article XIX of the Charter Laws of the City of Jacksonville)

In 1955, a special act was passed by the Florida State Legislature relating to the authority of the City of Jacksonville in improving, enlarging and extending the sewer system of the City. This act also provided a method for financing the cost of such a program. In this act, the City Commission of Jacksonville has the primary responsibility for determining that a sewer service charge is needed to develop and/or modify the city sewer system. This law covers both the area within the city limits of Jacksonville as well as the unincorporated areas within three miles of the city boundaries.

When the City Commission has determined that there is a need for this type program, it has the responsibility of certifying the need to the City Council. After the City Council has received this proposal, it must conduct a public hearing to study the matter and give all concerned an ample opportunity to be heard. After the hearing, the City Council has the responsibility of determining what sewer service charge, if any, should be imposed for the development of this program. No referendum or election by qualified voters is required for this service charge to be put into effect. This law has never been implemented.

Duval County

Water and Sanitary Sewerage Authority Act (Chapter 1248. Laws of Florida. Special Acts of 1959).

The Act was passed in order to authorize Duval County to create an agency for the purpose of establishing a proper water and sanitary sewerage system within the county, outside of the incorporated areas of cities and towns. The implementation of this Act was left to the Board of County Commissioners, who were to establish such an authority if they deemed it necessary.

This law also provides for the means of financing this water and/or sewer service facility. Revenue bonds may be issued to finance a program, with the repayment of these bonds being based on revenue received from the service charges imposed. Such a program may have financing by means of ad valorem taxes in addition to the revenue bonds, but a vote of freeholders within the prescribed area would be required before any ad valorem taxes might be imposed. The revenue bonds paid solely from the revenue from service charges do not require any vote. This law has never been implemented.

State of Florida

Florida Statutes on Water Pollution Control (Chapter 381 and 387 of Florida Statutes of 1965).

The Florida State Board of Health is charged with the responsibility for the elimination of all pollution of the underground water, lakes, rivers, streams, canals, ditches and coastal waters under the jurisdiction of the state. The supervision of all systems of water supply and sewage treatment is also given to the State Board of Health. The Board of Health also has the responsibility for approving all plans for water supply and sewage disposal within the state. The Board has the power to issue orders requiring the correction of any conditions which do not conform to the standards as set forth in the law. The State Board of Health has the power to enforce this law through appropriate legal measures.

The Laws of Florida make it unlawful for any person, firm, company, corporation or association to deposit in any of the waters of the state any pollutant liable to affect the health of persons, fish or livestock, or to allow any pollutant to be placed so that it might wash into the waters of the state and cause such difficulty. The State Board of Health is responsible for the enforcement of this law and has been given proper legal authorization for its implementation.

The rules of the State Board of Health concerning the implementation of laws relative to pollution of water are spelled out in Chapter 170 C-5 of the Florida Administrative Code. These rules are intended by the Board to prevent, eliminate or minimize pollution of waters in the state, consistent with the health, well being and safety of the citizens.

Financing Plans

A fundamental problem concerning any program for control of water pollution is related to the cost of such a program and how it may be financed. The cost of a program for Jacksonville has been outlined. There are two basic methods by which money can be raised within Jacksonville for sewer improvements. These two common methods are the use of ad valorem tax bonds (general obligation bonds) and revenue bonds.

The general obligation, or ad valorem tax, bonds are the most difficult of all bonds to obtain approval for issuing, because freeholders must endorse the plan by a special referendum. Such financing would be particularly difficult in Jacksonville for the foreseeable future, because of the great difficulties which have arisen relative to ad valorem taxes. It seems that any new form of financing which might be proposed by using this method is virtually doomed to failure before it gets started.

The second type of financing is through the use of revenue bonds, which may be payable from a specified source of revenue or payable from revenue other than ad valorem taxes or utility service taxes. Actually, the money for paying revenue bonds might logically be raised from a sewer service charge, which would be applied to all users of the system. Such a service charge has been widely used in other communities to finance sewer service. Most experts in the field say that it is absolutely essential for the sewer service charge to be tied in with the water service, so that the charges can be properly collected. Quite likely any sewer service charge would be based on a percentage of the water service charge.

The pledging of other city revenue which is not obligated might be used in place of a sewer service charge or in addition to a sewer service charge. This might include funds from cigarette taxes, franchise taxes, court fines and inspection fees. Any combination of these additional sources of money, in addition to the sewer service charge or in place of the sewer service charge, might be utilized.

In addition to funds from within the City of Jacksonville, there is the possibility that significant federal funds will be available to finance water pollution control. The full extent of available federal funds is not known, but it seems reasonable to believe that sufficient money for complete financing of the individual city-county sewer improvement programs will not be forthcoming. It is probable that a degree of local funds must be put into any such program, both in the construction and in the maintenance, improvement and expansion of a sewer system. There has become an increasing awareness in communities around the nation that the extent of federal financing of such projects is going to be very limited, with the burden of financing resting on the individual communities concerned.

There has been much emotionalism tied to the concept of having a sewer service charge. Although people in the Jacksonville area have come to take sewer service for granted, this is not actually reasonable. People have become accustomed to paying a service charge to receive water, and it should be only logical for them to come to realize that payment for removing the water which they have polluted is reasonable. Actually, one of the fundamental factors in the development of a sewer improvement program to control water pollution in the Jacksonville area will necessitate the development of a reasonable sewer service charge, which can be tied to the amount of utilization of the sewer system the individual or the industrial plant might make. A means for the development of a sewer service charge is already available to the City of Jacksonville.

Although there has apparently been some fear by elected officials that the expense of developing an adequate program of pollution control would be a political liability, this may not be true at all. The aroused citizens of the Jacksonville area are becoming aware of the seriousness of the water pollution within Duval County, which contributes 90% of the pollution of the waters of the state of Florida. The overwhelming problem which had developed in New York State led to a 1965 campaign to curb water pollution. This culminated in voter approval of a $1 billion bond issue, which was passed by a landslide vote in favor of the program of water pollution control. The final statewide figures in New York put the "Yes" tally at 3,037,370 and the "No" at 718,398 —a resounding 80.9% affirmative vote for the expenditure of this money, which constituted the second largest bond issue ever floated by an individual state in the United States. In New York, the bond issue provided financial aid to local communities. This overwhelming victory was attributed to thorough dissemination of information to the voters throughout the state. The results of this effort show clearly the recognition by individual citizens of the need for water pollution control.

Recommendations

1. All citizens of the Jacksonville area, all industrial and business leaders, all elected officials of the City of Jacksonville and Duval County, and all others who are interested in the continuing development of the Jacksonville area, should be made aware of the serious problem of water pollution in the Jacksonville area. These individuals must realize that this is their problem and that they must solve it.

2. The City of Jacksonville should proceed without delay in removing all of the gross pollution in the major tributaries of the St. Johns River within the corporate limits of Jacksonville, such as McCoys Creek and others, by adequate collection and pumping to the present treatment works for proper treatment.

3. The City of Jacksonville should enforce Chapter 34 of the Ordinance Code for the area within its jurisdiction. The basic provisions in the ordinance make it unlawful for any untreated sewage or industrial waste or other polluted waters to be discharged to any natural outlet within the city, except after suitable treatment has been provided. It also provides that the owner of any building or properties used for human occupancy shall install and connect with proper public sewers.

4. The City and/or County government should require that all existing commercial, business and industrial installations causing pollution of significant proportions be required to build and operate waste water treatment plants that will produce an effluent of such quality as to be acceptable in the rivers, streams, tributaries, etc., of the Jacksonville-Duval area.

5. As a corollary to recommendation #4, the City and/or County government should require that all new commercial, business and industrial installations shall build and operate waste water treatment plants that will produce an effluent of such quality as to be acceptable in the rivers, streams, tributaries, etc., of the Jacksonville-Duval area.

6. The City of Jacksonville should budget sufficient funds to cover planning of Phase III of the city program so that, if funds are not obtained from the Department of Housing and Urban Development, there will be no delay.

7. Construction money for Phase II of the Jacksonville program should be put in the city budget for fiscal year 1967.

8. The City Commission of Jacksonville should investigate, at the earliest possible time, the absolute necessity for establishing a sewer service charge. We believe that the Commission will be obligated to certify the necessity for this charge to the City Council, in accordance with the existing law covering this type of financing. The detailed plans for a sewer service charge should be developed by the fiscal consultants, along with a careful study of other sources of money. The committee believes that a sewer service charge is the only realistic method which can be employed as the basic financial support of the Jacksonville area sewerage program.

9. There should be adequate enforcement to insure the proper operation and handling of all of the sewage treatment and disposal plants in this area.

10. A county-wide comprehensive plan should be developed in cooperation with the Jacksonville-Duval Area Planning Board, so that the area can be eligible to receive funds from the various federal programs available for pollution control.

11. The Duval County Water and Sanitary Sewerage Authority Act of 1959 should be updated, revised and expanded to provide for public and/or private ownership of facilities to handle all municipal and suburban water and sewage. To accomplish this objective, the city and county attorneys, in consultation with the legislative delegation, should prepare the necessary modifications in this Act for the legislative delegation to put into law at the 1967 session of the Florida State Legislature.

12. The Jacksonville Port Authority should adopt rules and regulations, after consultation with the Florida State Board of Health, pertaining to oil spillage and marine sanitation.

13. A permanent citizens advisory committee, of not more than nine knowledgeable persons, should be appointed to assist in the implementation of the program for water pollution control.

LINDSAY NEWSPAPERS, INC., PUBLISHERS

The Herald-Tribune
SARASOTA JOURNAL

801 SOUTH TAMIAMI TRAIL
SARASOTA, FLORIDA 33578

25 March 1968

Mr. John R. Thoman
Regional Director, Technical Programs
Federal Water Pollution Control Administration
Southeast Water Laboratory
Athens, Georgia 30601

Dear Mr. Thoman:

I am forwarding a clipping of a recent column written by me and published in The Herald-Tribune, concerning pollution of the estuarine waters of Florida, the text of which I wish to be incorporated into the record of statements of the public meeting on the national estuarine pollution study conducted in Orlando on March 12 and 13.

My statement refers specifically to a statement delivered by Homer Hooks, spokesman for the Florida Phosphate Council, in which he implied that his industry was not involved in estuarine pollution. His implication does not reflect the facts of the matter.

My procedure, in enclosing a clipping, may not be the orthodox approach to submitting statements, but even if I rewrote the text, the essential premise would be the same.

Yours,

Clyde Burnett

Clyde Burnett

CB/f

Encl:

TELEPHONE: 958-7755
POSTAL DRAWER 1719

Florida Phosphate Council Spokesman Offers 'Cooperation' In Pollution War

From my
VIEWPOINT
by: CLYDE BURNETT

Among the statements submitted to the panel at the public meeting called recently in Orlando by the Federal Water Pollution Control Commission was a "position" read by Homer E. Hooks, executive director, Florida Phosphate Council.

Hooks gave assurance of the willingness of the industrials who are members of the Florida Phosphate Council to cooperate with the FWPCA.

There are three quotations from the statement which might be of some interest to the residents of Hillsborough, Manatee, Sarasota and Charlotte Counties.

Hooks said, "With specific regard to estuaries and estuarine zones, it should be noted that the operations of the phosphate industry are located quite remotely from the areas under study."

Again, he said, "since the great bulk of our industry is located many miles from the estuaries of Florida, we must frankly admit that we have very little knowledge about estuaries. The limitation of knowledge does not, however, prevent us from clearly stating out attitude and role in the general subject of water pollution."

Hooks cited the considerable expenditures of the industry in their abatement effort in areas of water pollution and cited the cooperation of member companies in aiding an official of the FWPCA to study their operations.

He closed by saying, "We trust that the foregoing illustrates the constructive philosophy now adopted and pursued by the Florida phosphate industry. Recognizing the limitations of our knowledge regarding the unique ecology of estuarine areas and our remoteness from them, we nevertheless felt that you are entitled to a statement of our position and philosophy. We want to assure you that this philosophy will continue and you may expect all reasonable cooperation from our industry."

What About?

Note that Hooks, at one point, did qualify his statement about the location of his industry by saying that the "BULK of our industry is located many miles from estuaries of Florida (emphasis supplied)." That qualification apparently leaves open some exceptions to that generalization, but some people might feel that those exceptions are relatively important.

We can begin, for example, by mentioning the fish kill in Bishop Harbor, Manatee County, adjacent to the Piney Point location of the Borden Chemical Company, which was described as "extensive" by the Manatee County Environmental Engineering Department. The department attributed that fish kill to the escape of acid waters from the company's waste water settling ponds.

Since that time, waters of Bishop Harbor have been monitored to determine the level of phosphate compounds present. Background analysis of the waters of that area were said to show "normal value in this are. . .less than 10 parts per million." That value, according to Ross Socolof, ichthyologist and member of the county's pollution control commission, was already well in excess of phosphorus centent of normal sea water, probably a result of agricultural drainage.

But now it is alleged by the engineering department of the county that "routine liquid waste discharge from the Borden Chemical complex" has raised phosphate levels to as high as "559 parts per million phosphates," according to a sample taken on Feb. 20, 1968.

Other values obtained from the county department show these levels: Feb. 20, 559 ppm; Feb. 21, 597 ppm; Feb. 22, 599 ppm; Feb. 26, 643 ppm; and Feb. 27, 542 ppm.

Socolof gave his interpretation of the meaning of this change in Bishop-Harbor by saying that the "ecological values" of the bay had been "changed." He cited algae growths resulting from nutrient "over feeding," as being evidence of an undesirable change and opined that even though free swimming fish, such as mullet, has since been observed in the area, that the biota of the area had been so changed as to be damaged.

Other Areas

Frank Cross, Manatee County environmental engineer, also took exception to the implications of the Hooks statement by pointing out that U.S. Phosphoric, located at Gibsonton in Hillsborough County, has a "gyp" pond, (a waste water settling pond in which solid wastes, primarily extremely coarse gypsum crystals, settle away from their acid liquids), drains directly into Tampa Bay.

Other Points

Bishop Harbor also drains into Tampa Bay.

One might also think of the Peace and the Alafia Rivers, which have been polluted several times in recent years, even though the industry adopted a dam building code of its own in 1960 which was supposed to abate the problem of slime pond dam breaks.

Those rivers terminate in estuaries, the Peace in Charlotte Harbor and the Alafia in Tampa Bay.

Total Effects?

In the case of the river pollution incidents, no definitive investigation was undertaken to assess the degree of the problem as was the case in the river courses which were investigated by the State Board of Health and the Game and Fresh Water Commission.

But it would be interesting to see if the Florida Phosphate Council would care to say that NO estuarine damage was done in these incidents. We recall that a suit was threatened by a Charlotte County crab meat dealer after the last pollution of the Peace River by Mobil Chemical.

One wonders too, in the face the expansion of the phosphate industry into northwest Manatee County, and the who-know where location of the next plant which may be built, what the public is faced with in the burgeoning attempt to preserve the water quality of the estuarine zones.

The loading of estuarine waters with phosphates and nitrates as a result of the introduction of sewage effluents is a problem to which we, the public, are just beginning to address ourselves, and are presumably going to pay for abatement. But what will be the object of the effort and the expenditures if industry is going to load estuarine waters with heavy doses of one of the very substances we are trying to conquer?

~~Perhaps Mr. Hooks can give us some answers to that question, and he might start by telling us just what he means, in practical working terms, by the word "remote?"~~

FLORIDA POWER CORPORATION
ST. PETERSBURG FLORIDA

Statement by Florida Power Corporation
National Estuarine Pollution Study
March 12-13, 1968
Orlando, Fla.

Florida Power Corporation appreciates the opportunity to present its opinion on the subject of use and development of estuarine resources. We understand that the public hearing today is required as part of a study which will result in a report to Congress, giving an analysis of the important uses of estuaries, and recommendations for a program for their preservation, use and development.

We feel that in the case of vital state assets such as our public waters, all of the uses must be considered, which include the practical needs of industry as well as the more aesthetic aspects related to recreational uses. We are concerned with both.

By virtue of the location of its service area and its facilities on the West Coast of Florida, Florida Power Corporation has a definite interest in the best usage of estuarine waters. The bays and coastal waters of Florida, and particularly in the Tampa Bay section and the coastal islands, are a most important economic and aesthetic asset. The maritime location of Pinellas County with Boca Ciega Bay on one side and Tampa Bay on the other, makes the condition, both now and in the future, of these waters important to our Company. The great benefits of the estuarine waters as recreational and tourist attractions accrue to our Company directly, as the visitor and permanent population of our service area increases and the usage of electric power increases.

1 We are most interested to insure, for our Company's well being, as well as that of the communities we serve, that our estuarine waters remain clean and unpolluted.

One important point which we feel should be made in discussing use of estuarine waters is the complete dependence in Florida on the use of these waters in the generation of electric power. We feel it is important for the public to understand this dependence and the need of our electric generation stations to utilize estuarine waters for cooling purposes in our power plants.

The process of generating electricity by thermal stations (steam power) inherently results in having to remove unusable low level heat by cooling it with large volumes of water. This water is pumped through the condensers and is warmed slightly. There is no other practical method of doing this cooling, nor has there ever been any problem resulting from this usage.

For example, in the Tampa Bay area, Florida Power Corporation has operated its Bayboro Station in St. Petersburg for over 40 years, taking in the Bayboro Harbor water and returning it slightly warmer. Similarly, our A. W. Higgins Plant at the extreme north end of Tampa Bay has operated since the early 1950's and our P. L. Bartow Station at Weedons Island since the late 1950's, all using bay water as the cooling medium. We have, through the years, scrupulously guarded against introducing or permitting accidental introduction of any pollutants into the waters at our power plants and believe that we have an excellent record in this respect. However, we wish to make it clear that, as an electric public utility, we do use, and must continue to use, bay waters for this purpose--or, not generate electricity.

At the present time there is much national attention being given to the matter of so-called "thermal pollution", much theorizing and conjecturing has been done on possible bad effects, and research is underway but the concrete results will take time. We believe it is important that the proven experience of electric operating companies be considered and to date, to our knowledge, there has been no unfavorable consequences from the many years of operation of our power stations using cooling waters from the bays and coastal inlets.

With respect to the role of government in estuarine management and development, we feel that basically this is a State of Florida responsibility, the same as any other waters in the State. The State's existing agencies can best see to it that the estuarine waters are protected, developed, and continue to serve the varied needs of the people of this State. State water quality standards have been developed, and State agencies are experienced and competent in the matter of insuring against pollution. We see the Federal role most useful in the area of research and studies, and in assisting the State when requested for special technical assistance.

We again express our appreciation for this opportunity, as one of the major users of estuarine waters, to express our position and opinions.

END.

THE PELICAN ISLAND AUDUBON SOCIETY

VERO BEACH, FLORIDA

March 11, 1968

Mr. John R. Thoman, Regional Director
Federal Water Pollution Control
Administration
Atlanta, Georgia

Dear Sir:

The Pelican Island Audubon Society of Vero Beach, Florida, wishes to present this letter for consideration at the water pollution hearing to be held in Orlando, Florida, on March 12 and 13, 1968.

Our membership comprises residents of Indian River County and we feel very fortunate in that we live in a beautiful section of the Indian River and that we have a cooperative and understanding Board of County Commissioners who are alert to the dangers of unrestrained development as it relates to the pollution problems in the natural areas of this river.

The valuable fish breeding grounds in the Indian River extending from the Sebastian Inlet south to the Wabasso bridge have in the past been threatened by proposed developments that would have extended bulkhead lines several hundreds of feet. We firmly believe that all bulkhead lines should not extend beyond mean high water. Where navigation and access channels are created the work should be accomplished only by the use of retention dikes and suitable weirs that will stop the flow of fine materials with the consequent destruction by sterilization of large areas of valuable bottom lands. In fact the bird life in the enlarged Pelican Island Federal Wildlife Sanctuary is entirely dependent on the food supply provided by this natural section of the Indian River.

Another factor with which we are concerned is the expanding use of causeways instead of pilings and bridges. Where there is a natural current and tidal ebb and flow it appears to us highly desirable to allow a free unhindered action of the stream. This will keep the pollution problems to a minimum and allow a self-cleansing by natural means.

Living in an agricultural community we are conversant with the problems of water enrichment and chemical pollution. Eventually it may be necessary to consider reversing the flow of some of our drainage canals to place the surplus water in the fresh water marsh storage areas where the enriched waters may be advantageous instead of detrimental.

Sewage and septic tank pollution is always a problem and a strict control should be provided. A constant enforcement effort of existing and future laws on this matter is of the utmost importance.

This community as many others may soon face the problem of Thermal Pollution in view of the fact that a proposed plan has been made to build a nuclear-fueled power plant in our area. We feel that a survey of the effects of such pollution should be made and every reasonable precaution should be required to see that a proper means of pre-cooling is devised and included in the proposed power plant expansion plans.

These are some of our local problems with which we are concerned and which we respectfully submit for your consideration.

Very truly yours,

THE PELICAN ISLAND AUDUBON SOCIETY

Mabel Michael

Mabel Michael, President

Loxahatchee River Chapter

IZAAK WALTON LEAGUE of AMERICA, INC.

JUPITER, FLORIDA

Mr. John R. Thoman, Reg. Dir.
Dept. of Interior, FWPCA
1421 Peachtree Street
Atlanta, Georiga. 30309

March 9, 196

Dear Mr. Thoman:

The Loxahatchee River Chapter of the Izaak Walton League of America has assumed the responsibility of keeping the values of our natural resources before the public. Our area of Jupiter Inlet, Jupiter Sound, the Loxahatchee River and surrounding territories have a potential of outdoor recreation unsurpassed for the future, in this unique section of the South East coast of Florida.

It is relatively unspoiled by man's developement to date, but there are needed safeguards to insure its proper place in the future.

1. Dredge and fill operations should only be permitted when required for total public welfare.
2. The remaining valuable mangrove areas should be protected.
3. Areas of the vegetated shore-line should be zoned so as to preserve existing tidal-beaches and shore-lines, which are essential to the ecology.
4. "Navigational Channels" should be located and constructed with great concern for the flats and oyster bars - at present these channels do not require a biological survey and often a slight re-location or re-aligment could preserve valuable nursery areas.
5. The sale of State-owned bottom lands should be prohibited and only title changes permitted when necessary for public usage.
6. Municipal, Industrial or Agricultural pollution should not be tolerated. It is far more economical to correct our errors now, before the more visible signs tell us it is too late.
7. The pristine headwaters of this unspoiled river should be fully protected in their present state to insure tidewater ecology.

Thank you for this opportunity to express our views on this most important estuary. More detailed information will be furnished at your request.

Sincerely,

Harry W. Kuck, Jr, President

S7

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STATEMENT

BEFORE THE
CENTRAL WATER POLLUTION CONTROL ADMINISTRATION
OF THE
UNITED STATES DEPARTMENT OF THE INTERIOR
BY THE
FLORIDA ASSOCIATION
OF THE
AMERICAN INSTITUTE OF ARCHITECTS

Florida Association of the
American Institute of Architects
1000 Ponce de Leon Blvd., Suite 210
Coral Gables, Florida 33134

My name is Herbert Rosser Savage, AIA, President of the Florida Association of The American Institute of Architects. This Association appreciates the opportunity to be present today to offer our concern on the matter of water pollution.

By means of their education and training, architects are concerned with the total environment of Florida, not only the design of buildings and residences. The architects of Florida are tremendously aware that pollution of Florida's water resources is a matter requiring prompt attention and action.

Environment includes the air surrounding us and for this reason I would like to interject at this point that the Florida Association of The American Institute of Architects has joined together with other concerned organizations in the formation of a Florida Council for Clean Air.

Florida's estuaries are many things: A river, a water shed, a landscape, a hinterland. For most of Florida's history these faces were among our ~~loveliest~~ most pleasant and least spoiled, though as time passed they bore increasing witness to the quickening growth by way of urban development. If present trends continue we can expect to have more Americans living in cities of 50,000 or more inhabitants by 1985 than there were in the entire country in 1960.

As our cities have traditionally grown they radically alter the old relationship between community and setting. The raw cutting edge of the city disrupts everything in its path. Few cities acquire sufficient parks, school sites or space for future roads ahead of time; suburban growth is left to after thought -- an easy mark for city trash dumpers, noise-producers and short-range interests.

As cities grow, more of their inhabitants seek relief from urban pressures in the new suburbs. The methods of Some suburban development have cut up the land into easy-to-merchandise lots, cut down the woodlands, filled the marshes, drained the valleys, and welcome newcomers to an often monotonous landscape. Open spaces are filled and so are the highways leading from new suburbia to old city. On weekends and during rush hours the old roads become clogged, the distant recreation areas overcrowded.

To these generalizations Florida is no exception.

In a quest for the most inviting contrasts to present conditions, city dwellers look above all to that special feature of the land on which the city depends for the slacking of its ever-growing thirst and which it generally treats as its sewer, the river. Water, whether in broad and quiet reaches or moving between banks in solemn tide or dashing over rocks, has a fascination for the human spirit. It is the medium of some of the most popular of sports -- boating, fishing, swimming. Along the banks of streams and rivers and in adjoining bogs and marshes, vegetation and wild life are profuse and interesting. Except where the shores have been blighted, rivers may be counted on to offer stirring vistas and pleasant and ever-changing scenery.

The destiny and development of Florida estuaries will not be realized until goals are defined. These public goals should be set to provide over the next 25 years or more, a region of carefully managed landscape and soils, well regulated streams supporting an abundance of wild life and fish, of urban and recreational development that will meet both the needs and the hopes of its residents and visitors throughout the state.

To achieve these goals we must consider the application of principles.

1. Provide cities, industries, farms and recreation areas with water.
2. Control disposal of sewage, industrial wastes and sediment so as to maintain clean water.
3. Diminish the hazards of floods and the consequences of drought.
4. Maintain farm land and forests to assure continuing productivity and landscape protection.
5. Identify and preserve for future use sites for new towns, dams, recreational areas and transportation arteries.
6. Protect and conserve wild life and its habitats.
7. Preserve all important physical manifestations of the state's historical heritage.
8. Promote land use compatible with the opportunities and constraints inherent in the landscape.

9. Provide adequate open space within walking distance for all urban and suburban residents.

10. Insure planned vistas throughout the region unmarred by eye sores and with new structures designed in a harmonious relation to landscape.

The Florida Association of The American Institute of Architects strongly recommends to your Department its services in establishing an interdisciplinary task force to study ways and means of maintaining clean water, protecting the natural beauties and providing adequate recreational facilities. The assembly of such a distinguished planning team, with a long and careful look within the state, would yield bold, balanced, far-sighted solutions to the man-made problems.

This recommendation is by no means a new idea, as you are well aware of the recent study, "The Potomac -- A Report on Its Imperiled Future and a Guide for its Orderly Development," prepared for the Department of the Interior by the Potomac Planning Task Force assembled by The American Institute of Architects at the request of Secretary Udall.

This recommendation is believed by the Association to be the most orderly procedure in developing a singular plan of action to cure the pollution of Florida estuaries.

I thank you.

March 12, 1968

STATEMENT OF R. Y. PATTERSON, Jr.
GENERAL ATTORNEY, FLORIDA GAS COMPANY

Mr. Chairman, I am pleased to be here today to present this brief statement. My Company, in addition to providing a cure for air pollution with the use of gas, can also help solve the water pollution problem. Pollution is pollution, whether it be in the water or air and similar activities and materials cause each. The difference is which medium is utilized to dispose of waste - air or water.

The State of Florida stands more to lose, economically and aesthetically, due to air and water pollution than any other state in the union. For this reason, Florida should be the most concerned with keeping its air and its water pure.

All the familiar standard causes that are cited by those who are calling for the need for urgency in dealing with water pollution, such as growing population, growing demand for water, et cetera, apply doubly in the particular case of our own State of Florida.

A quick glance at the map shows why! Of the entire coastline of the forty-eight contiguous states, Florida has over twenty percent.

Florida's inland water area makes up 7.6 percent of the total area--this is four times as great as the figure for the nation as a whole and compares with the 5.7 percent of Minnesota, the self-styled "Land of Lakes". These geographical facts, coupled with Florida's well-known higher rate of population growth, its high dependence on tourism and its large fishing and boating industry, make it obvious why water pollution control is so vital to the state.

All cities or municipalities on a particular river or lake are polluting water resources in some manner, but each city or municipality is different. Each has its own pollution problems. Some are discharging raw sewage, some are discharging inadequately treated sewage. These effluents contain phosphates, nitrate and other nutrients which cause undue growth of algae in the receiving waters, a serious problem in Central and South Florida.

Natural gas can help solve these problems. Gas fired commercial incinerators are available and in use in many supermarkets and shopping centers. Waste material that would otherwise be disposed of through conventional sewage systems is able to be completely burned by enhancing the natural combustion with gas. Demonstrations have been run with these units, burning rubber tires; the combustion is so complete that the exhaust air is completely clear and odorless. Thus, both air and water pollution is curbed.

Home incinerators are now available on the market, although not as generally used as the commercial installations. In the near future, with increasing attention paid to preventing pollution, such units should prove as feasible as the larger commercial types and popular with the householder.

Florida's problems, in addition to differing in magnitude to those of the nation generally, are unique and special in many ways and, as such, require specialized treatment best effectuated by those close to and familiar with the region. For these reasons the state and the local agencies should be given a prominent role in any management and control of water resources. Just as those people in Virginia and

Oregon are more aware of their individual local situations and are better able to deal with them, so too, is Florida.

In 1967 the Florida legislature created the Florida Air and Water Pollution Control Act. The purpose of this act is to conserve the waters of the state and to protect, maintain and improve the quality of public water supplies for the propagation of fish and wild life and for all beneficial uses.

I feel the state should be given a chance to make its program work and in the event the state's resources are too limited, then a working arrangement between the state and the federal agencies could be set up. However, I believe that for Washington to preempt the field entirely as has happened in other cases historically, would be a mistake and should only be done as a last resort if the state proves itself wholly inadequate to carry out the job.

To be sure, there is a need for overall cooperation and coordination so as to prevent duplication and wasted effort, but the bulk of the work should be done by those familiar with and close to the causes and the problems.

POLLUTION AND PORT DEVELOPMENT

As a preliminary to this presentation, it is believed it will be helpful to this study to give some background information on the Tampa Port Authority.

The Tampa Port Authority is a body politic and body corporate which has the duty and responsibility of planning and carrying out plans "for the long-range development of the facilities of and traffic through the Port (of Tampa) and the Port District" (Sections 4 and 7, Laws of Florida, Chapter 23338, Specials Acts of 1945).

The "Port District" includes all of the City of Tampa, the western part of Hillsborough County, and the harbor channels extending from the state line in the Gulf of Mexico to the Port of Tampa. Most of the east shore of Tampa Bay and the eastern part of Hillsborough County are NOT in the port district.

The primary responsibility of the Tampa Port Authority is to promote waterborne commerce through the Port of Tampa. This promotion includes leasing of waterfront land to port-oriented industry, sponsoring federal harbor improvement projects, administering the port, and encouraging trade.

While the Port Authority does have an interest in water pollution matters under the scope of its authority, this interest must be limited to whatever effect pollution has upon waterborne commerce, or vice versa. As a practical matter this interest is considerable. Polluted, odoriferous water in our port is obviously detrimental to commerce. Further, and extremely important, polluted water could conceivably affect public opinion to the point where port development and expansion could be curtailed. Any such curtailment would, in our opinion, stifle development and seriously deter the economic growth of the entire area.

The Port Authority also has a major interest in making certain that fire hazards caused by the spillage of petroleum are kept to an absolute minimum. (See attached letter to Florida Governor Claude R. Kirk, Jr. from Jack P. Fitzgerald, Port Manager, February 26, 1968.)

While the Port Authority has police powers under its legislative act, these powers for the most part have been construed as securing areas owned and administered by the Authority. The City of Tampa has broad police powers and ordinances have been adopted aimed at preventing the discharge of petroleum, trash, debris, acids, timber logs or refuse of any type into estuarine waters adjacent to the city limits. Most of the Tampa port facilities are located within this area. The U. S. Coast Guard and the U. S. Corps of Engineers have responsibilities under federal laws regarding the discharge of pollutants. The State of Florida also has similar laws.

In view of the broad powers delegated to local, state and federal governments and the limitations of its own powers, the Tampa Port Authority has not made it a part of its program to acquire expertise on matters of water pollution.

The Department of Interior's Federal Water Pollution Control Administration is presently making a study in the Tampa Bay area. Although incomplete, this study has put us a step ahead. We have worked closely with Mr. John E. Hagan, who is in charge of the study project, and he in turn has supplied us with much valuable information. For example, within the last year the Port Authority has undertaken a major port expansion project, part of which involved the dredging of a new channel and turning basin in northern Hillsborough Bay and the filling of approximately 1,000 acres of land. Close cooperation with Mr. Hagan relative to this project has enabled the Port Authority to evade any serious problems of pollution.

We believe that this clearly illustrates how a pollution control program and a port development program can succeed together.

The Port Authority is now awaiting Mr. Hagan's report which will come out of his study, and has every intention of undertaking whatever is necessary in following the report's recommendation insofar as our authority extends.

The Tampa Port Authority will continue to cooperate to the fullest extent with all federal, state and local agencies in efforts to control pollution of the waters of its port. The Authority stands ready to serve on committees, help conduct studies, aid in the promulgation of rules and regulations and use whatever police powers are available to it in the furtherance of this cause, always bearing in mind, however, its primary purpose, the commercial development of the Port of Tampa.

Finally, in its capacity as long-range planners and developers of the Port of Tampa, the Authority would caution against "overenthusiastic" federal programs relative to pollution which might prevent normal development and improvement of ports in general, and the Port of Tampa in particular.

Tampa Port Authority
GEORGE B. HOWELL MARITIME CENTER
811 WYNKOOP ROAD • P. O. BOX 981 • TAMPA, FLORIDA 33601

February 26, 1968

The Honorable Claude R. Kirk, Jr.
Governor, State of Florida
Tallahassee, Florida

Dear Governor Kirk:

We are in full accord with the statement contained in your letter of February 15, 1968, wherein you assert that Florida's water, estuaries, beaches and navigable streams must be protected for the use of all the people of the state, and every effort must be taken by responsible public officials to see that this goal is realized.

The Tampa Port Authority does not have a specific mandate to control pollution of waterways in the Port of Tampa. However, it does have broad powers under Florida law to establish regulations governing the operation and docking of vessels within the Port District, and to take whatever police action is deemed necessary for the effective control and regulation of waterfront facilities.

The City of Tampa also has broad powers under ordinances enacted by its City Council to take police action whenever necessary to control water pollution.

The U. S. Coast Guard has specific responsibilities under a 1961 Act of U. S. Congress regarding all pollution in U. S. seaports. The Port of Tampa is extremely fortunate in that it has a competent and efficient marine inspection division of the U. S. Coast Guard under the able direction of Captain of the Port Roger Madson, who is the senior Coast Guard officer.

Fortunately, the Port of Tampa has not experienced any serious spillages of petroleum in its harbor waterways in many years, but we are well aware that the danger is ever present. Those spillages which have occurred were generally attributable to terminal problems rather than to ship operations.

The Tampa Port Authority, together with Port Captain Madson of the U. S. Coast Guard, the City of Tampa Fire Department, and officials of various oil companies, have been holding discussions for the purpose of attaining better coordination and the pinpointing of responsibilities in the event of a petroleum spillage. This group has been working along the lines laid down by the Harbor Pollution Abatement Committee of Portland, Maine, which has established an excellent program at that port.

With these guide lines and innovations of our own we expect to have a new program for the prevention of water pollution implemented in the near future which will improve on our already excellent record in this respect.

In answer to your specific questions:

1. The senior officer of the deck on all tankers is responsible for a watch on the ship. He is also responsible for a "hose watch" aboard the ship. The terminal into which the vessel may be discharging or loading out of is responsible for a "hose watch" there. If this watch is not maintained, the ship is liable for accidents which may occur. All deck scuppers must be closed and there are regulations as to how hoses may be connected. A declaration of inspection is drawn up and signed by the U. S. Coast Guard.

2. There are no oil booms presently in the Port of Tampa but the aforementioned committee is studying how this type of equipment may be acquired for our port and put into operation.

3. The Port of Tampa does not have an oil skimmer such as is suggested in this question, but the acquisition and the pinpointing of responsibility as to who would operate it are matters under discussion by the committee.

4. There are 20,000 gallons of emulsifier immediately available in Tampa which could be swiftly utilized in the event of a spillage of petroleum. The emulsifier would be spread by the Tampa fire boat which is operated by the City of Tampa Fire Department and by tug boats called into service by the Port Authority.

5. Emulsifiers would probably kill some fish but there is little if any wild life in the commercial areas of the port where a petroleum spillage might occur.

6. As already stated, decontaminants are available at the port as mentioned above, and the fire boat and a number of tug boats are available if and when needed.

7. Oil companies and other waterfront operators have personnel skilled in the application of decontaminants.

8. The City of Tampa has the authority to arrest the commanding officer of a vessel responsible for air or water pollution in the port. The City has the power to file suit in admiralty in federal court and to place financial liability. The Tampa Port Authority and the U. S. Coast Guard

also have the power to file similar suits in admiralty in order to place financial responsibility whereby an offending tanker or other ship can be embargoed for a major violation in the Port of Tampa.

The Port Authority pledges its cooperation in reporting oil spills and other accidents with pollutants as quickly as possible after occurrence to the Board of Conservation, the State Board of Health, and the Director of the Air and Water Pollution Control Commission, as well as to the office of the Governor.

If your office should need additional information other than that which we have reported here, please advise.

Respectfully yours,

Jack P. Fitzgerald
Port Director

JPF:dcr

Pollution

THE AMERICAN ASSOCIATION OF PORT AUTHORITIES, Inc.

601 Southern Building, Washington, D. C. 20005

COMMITTEE III - SHIP CHANNELS & HARBORS

U. S.-120

February 2, 1968

TO: U. S. Corporate Members

During the 1966 Annual Conference, considerable interest in, and in some cases, concern over, the problem and implications of water pollution as related to port operations and development, was expressed by a number of members. At that time, there was some question as to whether or not, in view of the numerous Federal, State and local regulatory and control agencies involved, the port agencies were actually suitable participants for dealing in any way with this complex problem.

Because of the scant information available to the ports on this subject of growing importance, Committee III undertook the task of surveying the types of pollution involved, the laws concerned with them and the agencies administering these laws and various facets of research , development, aid and control programs. Accordingly, Committee III members Earle B. Butler, Albert T. Rosselli and Richard L. Schultz collaborated in preparing a survey on those questions as oriented to the interests of port agencies. A copy of this report is attached for the information of all members.

In completing this survey report, the report and further study leading to possible port action or policy is being assigned to Committee II, Standardization & Special Research. Technical questions on the report itself, however, may be referred to:

Col. Earle B. Butler, USA (Ret.)
Commissioner, Division of Harbors
Department of Port Control
City of Clevelend
101 Erieside Avenue
Cleveland, Ohio

Edward S. Olcott, Chairman
Alfred Hammon, Secretary
Capers G. Barr, Jr.
E. B. Butler
A. F. Clark,Jr.
D. C. Hill
Duanne Orr
A. T. Rosselli
R. L. Schultz
I. J. Stephens
C. L. Vickers
A. C. Morris
Paul Sorenson
A. Eschbach

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TAMPA PORT AUTHORITY

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REPORT OF
HARBOR POLLUTION TASK FORCE
COMMITTEE III - SHIP CHANNELS AND HARBORS

The Problem

Polluted harbor waters are rapidly becoming a major problem of public port entities and of ship operators; of major concern of the general public; and of major controls by cities, states and the Federal Government. The total pollution problem has become a national problem as emphasized by President Johnson in his January 30, 1967 message to Congress on "protecting our national heritage", and an international problem as emphasized by the "Torrey Canyon" disaster. In recognition of the ports' involvement in this problem, a Harbor Pollution Task Force of Committee III was formed in September 1966 to review the problem of harbor pollution to identify those areas of particular interest and concern to ports.

Involvement of ports is typically in the general areas of sewage and debris discharged from ships, location of spoil areas for dredgings from channels, oil spillage from ships and shore installations, wastes from industrial development in port areas and others. Numerous studies by many governmental agencies are underway now and new policies and laws are being formulated. City, State and National policy is apparently heading in a number of directions. The resultant regulations, laws and controls could cause ports to expend large amounts for development, capital equipment and additional dredging costs, if not fully understood by the study groups and lawmakers. Therefore, it is of the utmost importance that port entities make their voices heard and needs, interests and capabilities known at this time when the studies are underway and when new and modified laws are being written.

Existing Legislation and Amendments

To cope with the increased interest of legislators and government agencies in pollution, it is essential that port administrators have some working knowledge of the laws that apply. This is not as formidable as it might seem, since there are only a limited number of basic laws.

The veritable flood of new Acts with resounding titles are essentially amendments to existing laws. Suggested required reading are the following (U.S. Code annotated reference and short title given):

33 USC 407-415 - Refuse Act of 1899: This is the "grand daddy" of pollution laws. Replacing the earlier Acts of 1890 and 1894, its original concern was with "obstructions to navigation" by dredging spoil, etc. The "refuse" concept was subsequently broadened to include almost anything, worthless or valuable, solid or liquid, floating or sunken, including oil. This is the Act that gives the Corps of Engineers the power to designate spoil areas and remove wrecks.

Enforcement: Secretary of the Army (Corps of Engineers)

Penalties: $500 to $2500 and/or 30 days via Department of Justice. Also, injunctive relief.

33 USC 431-437 - Oil Pollution Act of 1924: This Act prohibits the discharge of oil generally on coastal waters and supplements, but does not supersede, the aforementioned "Refuse Act". Penalties apply for negligent pollution, but efforts are underway to make penalties and/or full liability for cleanup apply to any spillage.

Enforcement: Department of Interior (previously the Department of the Army, but transferred under the Clean Water Restoration Act of 1966) with the assistance of Coast Guard, (now under the Department of Transportation) and Customs Bureau (Department of the Treasury).

Penalties: $500 t0 $2500 and/or one year, and/or revocation of marine licenses.

33 USC 466-466k - Water Pollution Control Act of 1948: This is the Act that brings sophistication to pollution control. Under it, all states are required to establish Water Quality Standards, or in lieu thereof, Federal standards will be applied. The deadline for such standards was July 1, 1967; hence, the actual number and specific standards are not yet available. While standards will vary from state to state, certain key criteria as follows will probably be common to all:

Criteria	Measures/ Limits
BOD (Basic Oxygen Demand)	Organic matter (sewage & industrial waste)
Dissolved Oxygen	Organic matter (sewage & industrial waste)
Chlorides	Salinity (industry waste)
Filterable Residue (total solids)	Erosion (spoil dumping)
pH range	Acids (industrial effluent)
MPN (Most Probable Number)	Coliforms (shoreside and shipboard sewage)
Temperature range	Heat pollution (power plants)

Other criteria include absence of toxicity (for which there is no simple test), free or floating oil, and frothing or foaming material.

This Act, in Sec. 466f, created the Water Pollution Control Advisory Board and in Sec. 446-1, the Federal Water Pollution Control Administration. Various Executive Orders have expanded the policies and functions of the Act.

Enforcement: Department of Interior (transferred from the Public Health Service of H.E.W., plus state health departments and/or state water pollution control boards).

Penalties: Injunctive relief or withholding of Federal funds, plus whatever penalties the individual states apply.

33 USC 1001-1015 - Oil Pollution Act of 1961: This Act prohibits discharge of oil from U. S. ships within 100 miles from land, implementing the "International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended". This law supplements the Oil Pollution Act of 1924, with specific application to vessels.

Enforcement: Coast Guard assisted by the Corps of Engineers

Penalties: $500 to $2500 and/or one year plus revocation or suspension of marine licenses.

Proposed Legislation

A number of bills have been introduced in Congress which would amend present statutory authorities or create new authority. S. 1604, H.R. 9397, and H.R. 9675 would amend the present definition of "discharge" to include any accidental, or negligent spilling, leaking, pumping, pouring, emitting, or emptying of oil. H.R. 10168 would provide the Coast Guard with authority to conduct research and development for the purpose of dealing with the release of harmful fluids carried in vessels. S. 1568 would provide the President with authority to alleviate or to remove the threat to navigation, safety, marine resources, fish and wildlife, or the coastal economy posed by releases of noxious fluids or other substances carried in oceangoing vessels.

There have been introduced in the House of Representatives and referred to the House Committee on Public Works, five basic types of bills identified with these subjects as follows:

1) H.R. 17 - Pollution Abatement Recognition Act of 1967 (Horton)
2) H.R. 494 - Amending the Federal Pollution Control Act to strengthen and improve authority for re-enforcement of pollution abatement (Dingle)
3) H.R. 3764 - Rehabilitation of navigable waters of the Lakes (Handley)
4) H.R. 2109 - Lake Ontario and Lake Erie water pollution control (Horton)
5) H.R. 1481 - Prevention of pollution by interceptor drains in San Francisco Bay and Monterey Bay (Talcott)

There have been introduced in the Senate (Nelson) and referred to the Senate Committee on Public Works, a package of bills as follows:

1) S.847 - "to amend the Federal Water Pollution Control Act in order to improve certain programs under such Acts."
2) S.848 - "to provide a program of economic incentives to assist and encourage industry to assume its responsibility for abating and preventing pollution of water by wastes from industry sources, and for other purposes".
3) S.849 - "to expand and improve existing laws and to provide for the establishment of regulations for the purpose of controlling pollution from vessels and certain other sources in the Great Lakes and other navigable waters of the United States".
4) S.2525 - "to amend the Federal Water Pollution Control Act as amended, to control pollution from vessels within the navigable waters of the United States".

The Senate on February 6, 1967, passed S. 20 a bill to establish a National Water Commission to review water resources problems and programs.

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Federal Programs

The Coast Guard is presently seeking methods of preventing major releases of oil from ships and studying means to cope effectively with large oil spills, if preventive measures fail. Several existing organizations are studying the problem at the present time with Coast Guard participation; the National Committee on Oil Pollution; the Oil Pollution Panel of the Merchant Marine Council; and the Intergovernmental Maritime Consultative Organization. In April, 1967, an Interagency Oil Spillage Study Group was established under Coast Guard chairmanship with representatives of the Corps of Engineers and the Federal Water Pollution Control Administration. The Oil Spillage Study Group has recommended a literature review and evaluation which will establish the state of the art in the control and removal of major oil spills on water with the specific purpose of providing assistance in the establishment of standardized control and clean-up procedures, facilities, and areas where additional research and development activity are needed. One of the items under consideration is the possible source of oil pollution from vessels sunk off our coasts during World War II.

In May 1967, the President directed that the Department of the Interior and the Department of Transportation undertake, on an urgent basis, a study to determine how best to mobilize the resources of the Federal Government and the nation to meet the problem of pollution by oil and other noxious chemicals. The Coast Guard is presently working with the Federal Water Pollution Control Administration, the Office of Emergency Planning, and the Department of Defense, and other interested agencies, in a broad study of the oil pollution problem.

The Department of Health, Education and Welfare, Public Health Service, Interstate Carrier Branch, is in the process of publishing a "Port and Harbor Sanitation Guide" with a suggested ordinance which makes recommendations for control of discharge of sewage and solid waste from vessels when in port. This study is scheduled to be completed January 31, 1968, and may be obtained from the Chief of the Interstate Carrier Branch at 222 Central Parkway, Cincinnati, Ohoo.

The Federal Water Pollution Control Administration, Department of the Interior, pursuant to the Clean Water Resolution Act of 1966, has been given the responsibility to study the pollution problem attributable to vessels. This report was submitted to Congress August 7, 1967, and printed as Senate Document No. 48, "Report of the Department of the Interior Federal Water Pollution Control Administration to the Congress of the United States in Compliance with Section 17, Public Law 89-753". It contains recommendations for appropriate legislation to minimize any contribution vessels are making as follows:

> The control of sewage pollution from watercraft:
>
> Enactment of Federal legislation requiring the Secretary of the Interior to issue regulations setting forth standards applicable to the discharge of sewage from all classes of watercraft which are using the navigable waters of the United States.

The control of ballast and bilge water:

Legislation should be enacted to provide for regulating the disposal of ballast and bilge water from watercraft.

The control of litter and other related substances:

Legislation should be enacted to control the discharge from vessels of litter, garbage, sludge, and other related solids into the navigable waters of the United States.

The control of oil discharged from vessels:

This study is presently being undertaken by the Departments of Interior and Transportation as discussed above.

The control of pollution in the zone contiguous to our territory and territorial sea:

Legislation should be enacted to authorize the Secretary of the Interior to issue regulations governing the discharge from vessels of various substances, including sewage, garbage, sludge, and oil, into the nine-mile contiguous zone established by Article 24 of the Convention of the Territorial Sea and the Contiguous Zone.

The General Accounting Office presented to Congress in mid-January, 1967, a report presenting findings, conclusions and recommendations as to the need to improve procedures to prohibit depositing of industrial waste solids in navigable waters. This report recommends that the Secretary of the Army direct the Chief of Engineers to establish procedures for:

1) identifying industrial plants depositing waste solids into navigable waters,
2) providing a means by which the deposit of waste solids and resultant shoaling will be measured, and
3) requiring that any plant so identified stop depositing waste solids into navigable waters, or obtain permits, the purpose being to apportion the cost of maintenance dredging.

The Corps of Engineers is actively undertaking an experimental project in the Great Lakes to determine the extend that dumped dredgings actually pollute cleaner waters of a dump grounds area.

Earle B. Butler, Chairman
Harbor Pollution Task Force
Committee III, Ship Channels &
Harbors

Albert T. Rosselli, Member
Richard L. Schultz, Membet

Orange County, Florida

BOARD OF
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COUNTY ATTORNEYS

ORLANDO, FLORIDA

March 12,1968

Mr. John Thoman
Federal Water Pollution
Control Administration
Suite 300
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

The Orange County Commission is interested in good management of our neighboring counties' estuarine waters. This is particularly true with regard to the recreational aspects. Many Orange County residents enjoy the fine boating and swimming which currently prevails in those waters.

We recommend every consideration be given to remove existing pollution, stop indiscriminate dredging and excess overland drainage. This natural resource should be managed to where the greatest number of people will obtain the maximum beneficial use.

From discussion with our neighboring county officials, it is ascertained that additional research work should be performed to determine in many areas. One such project would be to find concentration of nutrients which can be effluented into estuarine water without causing excessive degradation to the biological population.

We recommend that those state and local agencies vested with regulatory powers on conserving this natural resource enact a step up program of enforcement. Also, enact a plan of management whereas it will be useful to the maximum number of people.

Sincerely,

JAMES T. COOPER

JTC/bs

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G. D. THORNTON,
Editorial Committee Chairman
College of Agriculture, IFAS
University of Florida,
Gainesville 32601

THE SOIL and CROP SCIENCE SOCIETY of FLORIDA

TWENTY EIGHTH ANNUAL MEETING

March 8, 1968

Mr. John R. Thoman
Director of Technical Programs
Southeast Region
U.S.Dept. of Interior
Federal Water Pollution Control Administration
Suite 300, 1421 Peachtree Street N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

The Soil and Crop Science Society of Florida appreciates the invitation to participate in the National Estuarine Pollution Study meeting to be held in Orlando, March 12-13, 1968.

As a group interested in maintaining and improving the productivity of the land we would support legislation and research that would accomplish this end. Many of us are engaged in research activities with the Institute of Food and Agricultural Sciences of the University of Florida and would favor participation and cooperation in research projects in pollution studies. It should be pointed out that a number of us are already participating in such projects.

It is our intention in this brief statement to indicate that we do support this endeavor and hope to be able to contribute to a solution of this important problem.

Sincerely,

C M Geraldson

C. M. Geraldson
President

STATLER HILTON INN
LIDO BEACH, SARASOTA
DEC. 3, 4, 5, 1968

CMG:hws
cc: Dr. Ernest L. Spencer
Dr. C. F. Eno

LAMAR HANCOCK
PRESIDENT
SUWANNEE COUNTY
LIVE OAK

BRUCE J. SCOTT
VICE PRESIDENT
LEE COUNTY
FT. MYERS

ALAN TRASK
SECRETARY-TREASURER
POLK COUNTY
FORT MEADE

STATE ASSOCIATION OF COUNTY COMMISSIONERS
THE PEOPLE'S GOVERNMENT of Florida ANSWERABLE TO THE PEOPLE

E. R. HAFNER
EXECUTIVE SECRETARY
P. O. BOX 549
TALLAHASSEE 32302
PHONE 224-3148
AREA CODE 904

WILLIAM J. ROBERTS
TALLAHASSEE
GENERAL COUNSEL

March 12, 1968

Chairman Thoman, Vice Chairman Reed, Ladies and Gentlemen:

It is a great pleasure to attend the National Estuarine Pollution Study Conference as a representative of the State Association of County Commissioners of Florida.

I know of no more important project than the proper review of our estuarine facilities. Man and nature are often competing for the use of these valuable bodies of water. Florida must find a solution in its quest for future development, yet recognize its dependence on the estuaries for the reproduction of fish, bird life and continuation of recreational advantages which we enjoy.

As President of the State Association of County Commissioners, I am deeply concerned with the loss of our estuaries to pollution. County and municipal governments, in cooperation with the Florida Air and Water Pollution Control Commission and the sanitary engineers of the State Board of Health, must find ways of disposing of treated affluence other than dumping them into our shallow bay waters. I am most hopeful that the federal government will continue the vital study of ocean outfalls.

I am alarmed at the increasing dredge and fill operations throughout the state. We should catalog areas that are to be developed and areas that are to be left in pristine condition.

In conclusion, I am delighted to be here today to express our real interest and concern. I feel that the State of Florida is capable of solving its own problems, but I am appreciative of our federal friends being in attendance today. Our Commissioners and I are confident that Florida's wise use of its estuarine areas will come about as a result of the interest expressed here today.

We feel that increased matching funds must be made available so that we can expedite total waste control throughout the State of Florida.

Again, let me express my thanks to you for the opportunity of bringing you our message in this manner.

Lamar Hancock
President

AFFILIATES: COUNTY ATTORNEYS ASSOCIATION; STATE ASSOCIATION COUNTY ENGINEERS AND ROAD SUPERINTENDENTS; STATE ASSOCIATION COUNTY PLANNING AND ZONING DIRECTORS; COUNTY SERVICE OFFICERS ASSOCIATION; STATE ASSOCIATION COUNTY WELFARE EXECUTIVES; FLORIDA ASSOCIATION COUNTY HEALTH OFFICERS; FLORIDA STATE CIVIL DEFENSE ASSOCIATION; FLORIDA ASSOCIATION OF COUNTY AGRICULTURAL AGENTS; STATE ASSOCIATION OF COUNTY PARKS AND RECREATION EXECUTIVES

ESTUARINE POLLUTION AND THE UNITED STATES SHRIMP INDUSTRY

by William R. Neblett

This presentation is made on behalf of the National Shrimp Congress, a national trade association with headquarters in Key West, Florida, of which I am the Executive Director. This presentation is concurred in and endorsed by the Florida Shrimp Association, with headquarters in Tampa, Florida. The entire shrimp industry is directly and vitally concerned with the problems of estuarine pollution. Estuaries are the life and death of shrimp, as I will detail later. I will confine myself primarily to estuarine conditions in Florida, and particularly in the Tortugas area, however, the same general principles apply in the Louisiana bayous, in Galveston Bay and Brownsville, Texas, and wherever we find shrimp.

In preserving the shrimp fishery we are not speaking of pennies. Shrimp is the Number One United States fishery in dollar value, and the first one in history to pass the one hundred million dollar mark. One hundred million dollars was the amount paid dockside, to the boats and crews in 1967 for the shrimp harvested by U. S. vessels domestically, and over 90% of this bonanza came from the Gulf of Mexico.

My own county of Monroe leads the State of Florida in value of fisheries. With us it is the third largest industry, accounting for more than six million dollars per year in our economy.

There are perhaps 6,000 vessels and boats fishing for shrimp. Of these, there are about 1,500 vessels of 50 to 90 gross tons, employed exculsively in the catching of shrimp. A new shrimp trawler in this category costs from $60,000.00 up to build and equip, so that the investment in trawlers is considerable. There is a further heavy investment in dockside facilities, and, after the harvesting, there is further investment in refrigerated transport, cold-storage and processing facilities and related industries which runs into the millions of dollars.

When we speak of the catch of shrimp from the Tortugas grounds we include Sanibel Island because the same variety of commercial pink shrimp is found there. The Bureau of Commerical Fisheries, Department of Interior, has furnished statistics of this catch from the year 1956 through 1967, which is here reproduced as Exhibit "A". This fishery was first discovered in the winter of 1949-50, when a commercial exploratory trawler, after disappointing daytime trawls, put its nets over at night. Since that time commercial fisherman have taken from these grounds a total of more than two hundred million pounds of pink shrimp, with a value to the boats and fishermen of more than one hundred million dollars. See Exhibit "B" for description of the Tortugas-Sanibel shrimp fishery.

This is an annual crop which can endure forever. We need not plough, nor seed, nor fertilize. We need only to preserve and protect the natural environment which makes this sea crop possible. Without the proper estuarine conditions, this stock of shrimp would disappear, because the estuary is a vital link in the life cycle of the shrimp.

LIFE CYCLE OF SHRIMP IN THE TORTUGAS AREA

The following comments regarding the life cycle of shrimp in the Tortugas area are quoted almost verbatim from remarks of Dr. Clarence P. Idyll, Institute of Marine Sciences, University of Miami. Dr. Idyll is an authority on this subject, and we have drawn upon his knowledge freely, with his consent.

Spawning of the "pink shrimp" occurs in the Tortugas grounds, offshore and generally North of the Florida Keys between Key West and the Dry Tortugas. The fertilized eggs are cast free in the water, hatching in about half a day to a tiny larva. In the space of about three weeks the shrimp pass through some 11 larval stages, during which time millions of them have travelled from the Tortugas grounds to the mainlands of Florida - the estuaries. In this case the estuaries are primarily within the Everglades National Park. For about half a year they live in the estuaries, where large quantities of fresh water exclude marine enemies, and where warm temperatures and rich supplies of food favor their growth and survival. Then the migrating urge hits them, and in great numbers they reverse their route and head to sea once more, to spawn and to be caught by the commercial fishery.

The ancients thought that the natural resources of the sea were inexhaustible. Modern science knows better. In our own life we have seen the destruction of certain stocks of fish or their displacement by other types of marine life. Yet, despite the many other factors which might reduce this stock of Tortugas shrimp, such as natural predators, overfishing, etc., the one factor which could certainly destroy it would be such a change in estuarine conditions that the shrimp would lack a proper nursery.

Dr. Idyll says that it is clear that there cannot be a large pink shrimp population, large enough to support a commercial fishery, without a brackish estuary, as is found in the Everglades National Park. Reduced salinity is vital to the young shrimp. The estuary provides two important factors: protection from predators and abundance of food. The kinds of fishes most abundant in the estuary, unlike their cousins in the salty sea, are those kinds which, generally speaking, do not eat shrimp. The natural animal and vegetable life found only in estuaries provide the proper food for the young shrimp, who like to burrow in the mud.

COMPETITION FOR ESTUARIES

From a fisheries standpoint scientists say that some of the regions where fresh and salt water mix are often 1000 times as productive of life as either fresh water or sea water. Even the origin of life is said to come from some brackish lagoon where land and water adjoin. A writer of fiction might, on the other hand, characterize these swampy areas as fever-ridden and mosquito breeding.

Men have always loved to dwell and have their businesses at the water's edge. The major cities of the world have been sea or river ports for the sake of commerce. Florida today is the mecca for lush sub-tropical living and its phenomenal growth continues apace to require the setting aside of more and more land for residences. Water-front lots cost double the price of lots just one block inland and the land developer's equipment is busy dredging and filling so more and more homes or apartments may face on canals.

To facilitate waterborne commerce and pleasure-craft some times access canals have been cut without regard to the effect on the ecology of fish and wildlife. There are other and many competing uses for estuaries which, if not watched carefully, will cause the end of many species of wildlife.

Actually, estuaries comprise a very small part of the United States, less than one percent. However, half of this estuarine area is found in the five states that border the Gulf of Mexico. According to Seton Thompson, Regional Director of the Bureau of Commercial Fisheries, St. Petersburg, Florida, in the Gulf of Mexico 90% of the commercial catch is made up of fish and shellfish that spend some time of their lives in estuaries. A recent survey disclosed that at least four percent of the Gulf estuarine areas have been totally removed from a biologically productive status.

The Central and South Florida Flood Control District was created many years ago as a notable and excellent vehicle for draining parts of the Everglades, controlling floods, and making available new, rich farmland which has proven highly productive. Also, to keep some of our excellent tourist facilities on the Southeast Coast, more familiarly known as the "Gold Coast" from washing out to sea, several water conservation areas were created and dikes and dams were built to control the flow of this water.

To relieve the pressures on Lake Okeechobee, when the Army engineers felt that water levels were so high as to be dangerous, particularly in hurricane years, only two fresh water escapes have been available; one to the Gulf via the Caloosahatchee River, and the other to the Atlantic via the St. Lucie canal. Much valuable fresh water has been diverted down these avenues at critical times, without any benefit to the seacoast at either outlet, rather to the contrary. Yet, there are times when the precious marine and animal life in the Everglades National Park has suffered from a lack of water, with damaging results of causing smaller estuarine areas and higher salinity. Even the unscientific fishermen who man the shrimp trawlers speak knowingly of the "wet" years and the "dry" years, and know that there is a relation between the proper maintenance of the estuary which is the shrimp nursery ground and their livelihood which is the capture of the adult shrimp.

When Central and South Florida was a "sea of Grass" made by nature there were still some dry years when the estuaries suffered from an abnormally low input of fresh water, but since man has "improved" the area to the North of the Everglades he has correspondingly failed to consider the necessity of the estuary for fresh water. Yet with the fresh water reserves available it is now really possible for the first time to nourish this outstanding estuarine area in a controlled and intelligent manner, and the prime recommendation of this paper is that such controls be instituted. We need rich muck lands for vegetables and sugar cane; we also need wet lands for shrimp and other marine life. We need wet lands for the conservation of certain species of animal life that live nowhere else in this country. We have probably the outstanding estuarine area in the United States in the Everglades National Park and its proper management can well serve as an example for other parts of the country.

FUTURE FOOD

At the present time we are using less than 25% of the available food resources of the sea. The world population increases at such a rate that a food shortage is predicted within a short span of years. Thus, the untapped resources of the sea may be likened to a bank in which we keep our savings against a rainy day.

As an adviser to the Department of State on Fisheries and Oceanography I am constantly aware of the efforts being made on a national and international level to resolve many thorny fishery problems which arise from legal concepts of jurisdiction over areas of the sea. Fisheries have become so important that brand-new terms of reference have been contrived. In addition to the territorial sea we now recognize a contiguous zone exculsively for fisheries. In 1966 both the United States and Mexico established such zones to a 12-mile limit and have since entered into solemn agreements concerning rights to fish in the new zones. Vast Soviet fishing fleets have appeared in the Northeast Atlantic and off Alaska and national thinking about fisheries has been stimulated by such activity.

Biologically, more than 90 percent of the world's fishery stocks are found over the Continental Shelf. Again, the major portion of these important fishery stocks use estuaries as part of their natural lives. Most fish, it seems, have a link with the land at its confluence with water.

We do not dwell here on the well-known adverse effect which river pollution brings to fish stocks at the river's mouth, nor on the poisoning by insecticides, or other evils. We only emphasize the association of the valuable food available in the ocean with the proper care, maintenance and managment of estuaries.

There is a school of thinking that believes that mankind is busily seeking self-destruction. This philosophical group may be proven to be right if we do not forthwith take adequate and positive measures to protect the one area in the life cycle of food fish which we can protect because we do have jurisdiction over estuaries. We may be helpless under current international law to stop fish slaughter 13 miles off of our coasts, but even here, under the 1958 Geneva Convention on Fisheries we are able to take some action and I foresee continuing activity in the conservation field in the World Community to preserve fishery resources.

While the slow process of international negotiation is taking place, let us move more rapidly to preserve our natural estuaries. As our people learn the true significance of this food problem they will give their support to the legislators who, in turn, can give us proper laws for the protection of estuaries and necessary funds for their management and preservation.

QUANTITY AND VALUE (Ex-Vessel) OF SHRIMP LANDINGS FROM TORTUGAS AND SANIBEL GROUNDS

	Pounds (Heads off)	Value
1956	12,337,554	$6,860,667
1957	9,967,867	5,850,583
1958	14,404,129	7,795,685
1959	8,206,911	3,762,634
1960	14,679,762	5,774,417
1961	10,980,336	4,951,863
1962	8,772,528	5,783,103
1963	10,450,300	5,223,598
1964	12,064,550	5,992,202
1965	12,434,972	6,780,372
1966	12,950,306	8,511,068
1967*	8,946,100	6,023,443

*Preliminary

The above table was furnished by the Region 2 Office of the Bureau of Commercial Fisheries, St. Petersburg, Florida.

Exhibit 1.

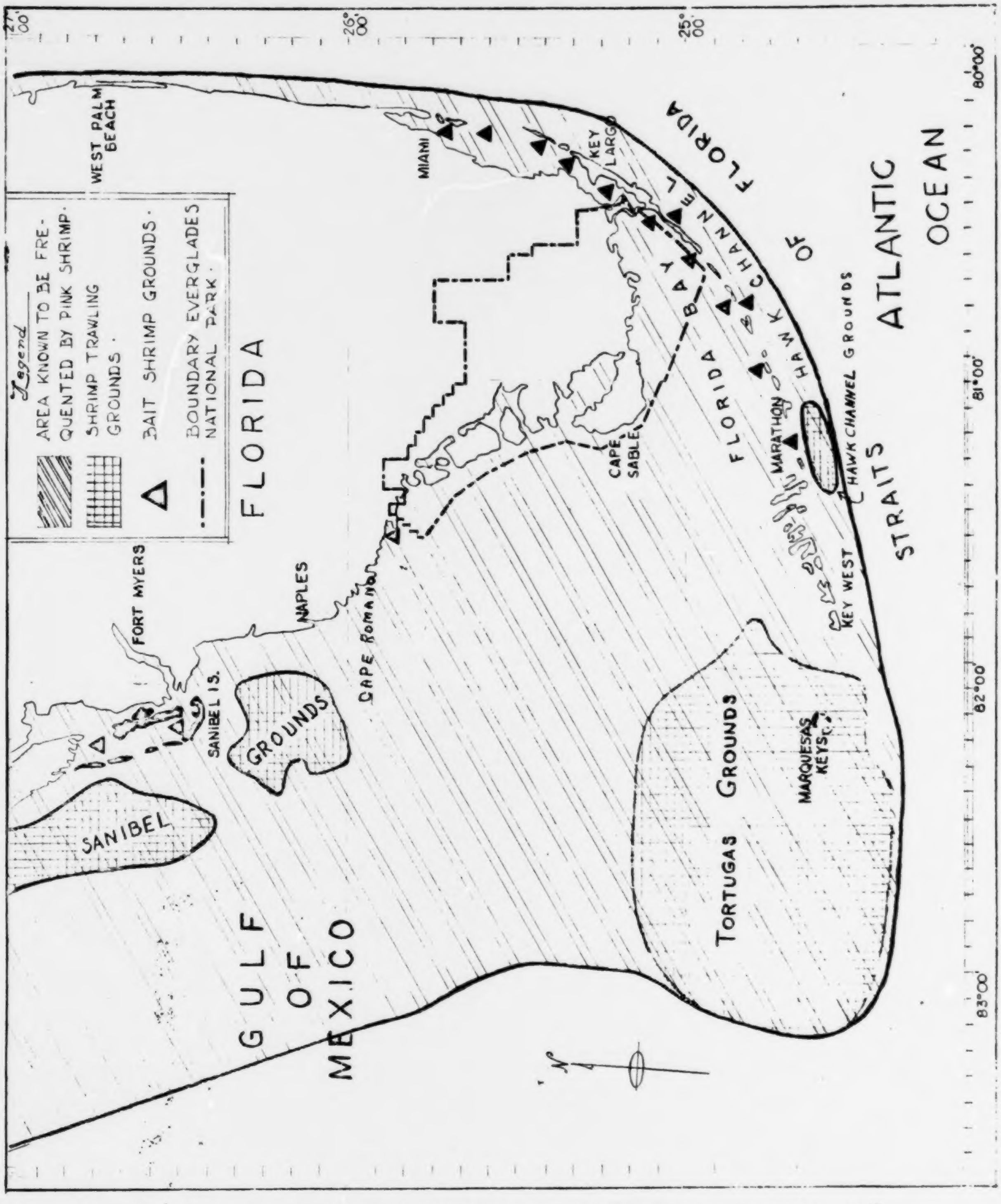
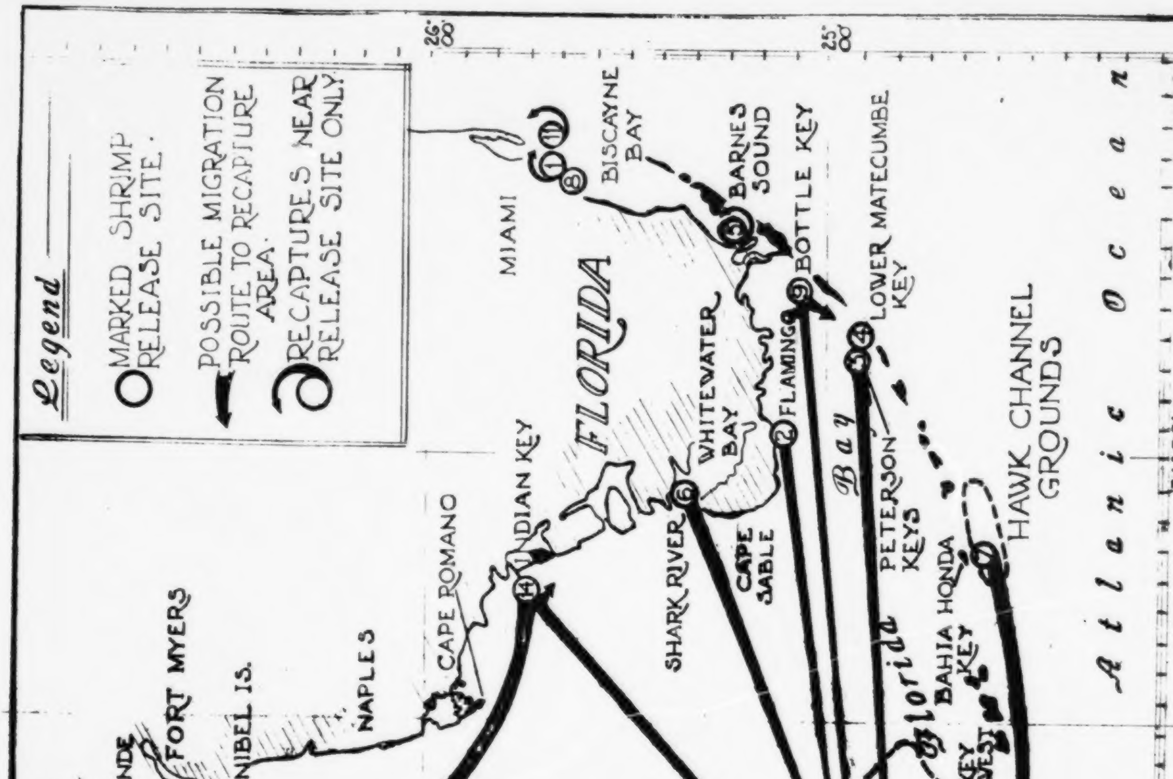

Legend
AREA KNOWN TO BE FREQUENTED BY PINK SHRIMP.
SHRIMP TRAWLING GROUNDS.
BAIT SHRIMP GROUNDS.
BOUNDARY EVERGLADES NATIONAL PARK.
FLORIDA
GULF OF MEXICO
ATLANTIC OCEAN
STRAITS OF FLORIDA
HAWK CHANNEL
FLORIDA BAY
SANIBEL
GROUNDS
SANIBEL IS.
TORTUGAS GROUNDS
MARQUESAS KEYS
HAWK CHANNEL GROUNDS
WEST PALM BEACH
MIAMI
KEY LARGO
FORT MYERS
NAPLES
CAPE ROMANO
CAPE SABLE
MARATHON
KEY WEST
N
27°00
26°00
25°00
80°00
81°00
82°00
83°00

Figure 1

From Bureau of Commercial Fisheries Study by Staff, Region 2, April, 1964, "TORTUGAS PINK SHRIMP STOCKS AND [5] THE EVERGLADES ESTUARIES".

Exhibit 2 - A


Legend
MARKED SHRIMP RELEASE SITE.
POSSIBLE MIGRATION ROUTE TO RECAPTURE AREA
RECAPTURES NEAR RELEASE SITE ONLY
Gulf of Mexico
Atlantic Ocean
FLORIDA
Florida Bay
MIAMI
BISCAYNE BAY
BARNES SOUND
BOTTLE KEY
LOWER MATECUMBE KEY
FLAMINGO
WHITEWATER BAY
SHARK RIVER
CAPE SABLE
PETERSON KEYS
HAWK CHANNEL GROUNDS
BAHIA HONDA KEY
KEY WEST
INDIAN KEY
CAPE ROMANO
NAPLES
FORT MYERS
SANIBEL IS.
BOCA GRANDE
P. SOUND
SANIBEL GROUNDS
"C" CONSERVATION BUOY
TORTUGAS GROUNDS
26° 00'
25° 00'
80° 00'
81° 00'
82° 00'
83° 00'

Bureau of Commercial Fisheries Study - "TORTUGAS PINK SHRIMP STOCKS AND THE EVERGLADES ESTUARIES".

Exhibit 2 - B

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WILLIAM R. NEBLETT

Born: 1906, in Matanzas, Cuba.

Education: Candler College, Habana; Florida-Southern College; college of Law, University of Miami, LL.B.

Military Service: U. S. Marine Corps, U. S. Coast Guard, U. S. Navy, retired 1947 after 20 years active duty; Commander.

Activities: Practising attorney, Neblett, Sauer & Chappell, Key West. State Senator, 24th District of Florida, 1954-1958. Special Assistant Attorney General, Florida, 1958. Executive Director, National Shrimp Congress, 1957 to date. Member, U. S. Delegation, U. S. Conference, Law of the Sea, Geneva, 1958 and 1960. Member, U. S. Delegation negotiating treaties or agreements, Cuba, 1957; Mexico, 1967.

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Member:
American Bar Association (Committee on International Fisheries.)
The Florida Bar
American Society of International Law
International Oceanographic Foundation
Advisory Group to Department of State for Fisheries and Oceanography.

City Commission of the City of Jacksonville

RICHARD B. BURROUGHS, JR.
COMMISSIONER OF
HEALTH AND SANITATION

E. R. SMITH, M. D.
CITY HEALTH OFFICER

DEPARTMENT OF PUBLIC HEALTH
982 MAIN STREET

March 7, 1968

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control
Administration
Athens, Georgia

Gentlemen:

Subject: National Estuarine Pollution Study

I am attaching a statement entitled "A Brief Summary of Pollution Investigation in the St. Johns River Estuary" to be presented at the above referenced meeting.

I would appreciate being scheduled for March 12, 1968, if possible.

Yours very truly,

Thomas B. Ard

Thomas B. Ard
Sanitary Engineer
Division of Environmental Health

TBA:co

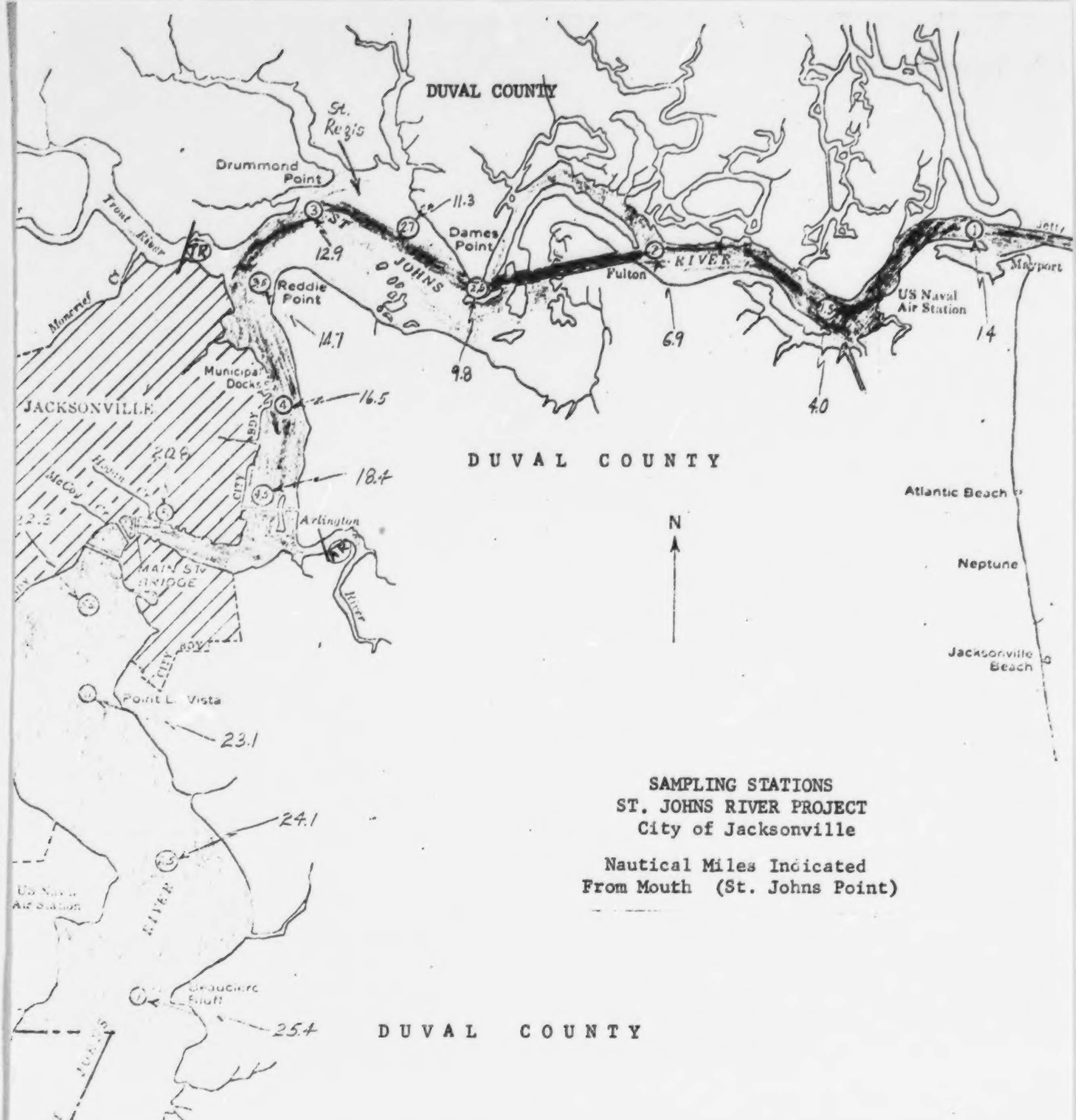
Encl.

CC: Mr. John R. Thoman
Regional Director

A BRIEF SUMMARY OF POLLUTION INVESTIGATION
IN THE
ST. JOHNS RIVER ESTUARY

PREPARED FOR PRESENTATION AT THE
NATIONAL ESTUARINE POLLUTION STUDY
MARCH 12-13, 1968
ORLANDO, FLORIDA

THOMAS B. ARD
SANITARY ENGINEER
DIVISION OF ENVIRONMENTAL HEALTH
DEPARTMENT OF PUBLIC HEALTH
CITY OF JACKSONVILLE
JACKSONVILLE, FLORIDA


DUVAL COUNTY
St. Regis
Drummond Point
Trout River
TR
Moncrief Cr
3
12.9
27
11.3
Dames Point
ST JOHNS
2.5
9.8
2
Fulton
RIVER
6.9
1.5
4.0
US Naval Air Station
1
Mayport
Jetty
14
3.5
Reddie Point
14.7
Municipal Docks
JACKSONVILLE
4
16.5
CITY BDY
4.5
18.4
20.8
Hogan Cr
McCoy Cr
22.3
5
Arlington
AR
River
MAIN ST BRIDGE
CITY BDY
DUVAL COUNTY
N
Atlantic Beach
Neptune
Jacksonville Beach
Point La Vista
23.1
24.1
US Naval Air Station
RIVER
Beauclerc Bluff
25.4
DUVAL COUNTY
ST JOHNS
26.8
Julington Cr
ST. JOHNS COUNTY

SAMPLING STATIONS
ST. JOHNS RIVER PROJECT
City of Jacksonville

Nautical Miles Indicated
From Mouth (St. Johns Point)

The St. Johns River rises in a swampy area about 50 miles north of Lake Okeechobee and flows north approximately 275 miles to the Atlantic Ocean, with a gradient of about 20 feet. Generally, the river is 22 miles inland and parallels the seacoast. The drainage area comprises about 8,000 square miles. Tidal effects are felt regularly at Palatka and have been felt as far as Lake Harney above Sanford. The tidal fluctuations at Jacksonville average about 1.1 feet. The river level in the tidal portion is strongly influenced by the winds and, at times of long continual strong winds from the easterly quadrant, the level of the water surface at Jacksonville may rise between four and five feet above mean sea level.

The St. Johns is a river of great variability and I am certain that even after 14 years of work on this river I do not know all of the variables. It is a mighty and dynamic river; at times sending thousands of cubic feet per second to the ocean and, at other times storing water in the basin with a negative net discharge. It is an ever changing river with all variables changing minute to minute and hour to hour.

The City of Jacksonville, at present, has an area of approximately 39 square miles with 9 square miles of water and 11 miles of the St. Johns in the City of Jacksonville. On October 1, 1968, when the new consolidated government goes into effect, Jacksonville will have a total area of 823 square miles and 34.5 miles of the St. Johns will be in the City of Jacksonville. Jacksonville exists today because of the St. Johns and its future will be controlled largely by the St. Johns as we develop our port and traffic on the cross state canal. So, it is obvious that the city is vitally interested in this river. The City has a three-phase program of constuction and planning for the correction of pollution of the St. Johns by city sewage.

On October 25, 1954, the City of Jacksonville made the first of five surveys on the St. Johns River. These large scale surveys sampled the St. Johns at eight stations from Mayport to Orange Park. Samples were taken simultaneously at eight stations every hour on the hour at three depths for a 13-hour tidal cycle. Five surveys were made at three month intervals. Due to the high cost and the analytical results, the eight station program was cancelled at the end of 15 months.

In 1957, the City built a permanent sampling station on the north pier of the Main Street Bridge (Station 5). This station was equipped with three five gallon per minute electric pumps to draw samples from 2 feet, 38 feet and 73 feet below the surface. The pumps are run continuously for a 13-hour tidal cycle and samples are collected from the pump discharge.

On June 16-17, 1958, a 26-hour sampling was conducted at the Main Street Bridge.

Knowing that the City was constructing new sewers and a treatment plant at a cost of 17 million dollars to serve the northwest part of the city, which had not been sewered previously, we started a program of 13-hour tidal cycle sampling at Main Street Bridge on June 8, 1959. In addition to Main Street, we sampled at maximum flood and maximum ebb current at Drummond Point (Station 3), Trout River, Port Authority Docks (Station 4), and Arlington River. We wanted to have some data on this portion of the river before the new sewage treatment plant went into operation on April 14, 1961.

On December 13, 1965, we sampled Station 1, Mayport, and Station 8 at Orange Park. We found conditions about the same as in 1955.

This program has been in operation every 60 days since June 8, 1959.

From October 25, 1954, to date, we have taken 12,090 samples of the St. Johns and have performed 22,295 analyses.

Today, the principal sources of pollution to the St. Johns in Duval County are:

1. City of Jacksonville. Approximately 15 MGD of raw sewage from 150,000 people.

2. Two mills discharging approximately 90 MGD with a population equivalent that has ranged close to one million people.

3. Petroleum products. Spillage from tankers and barges.

4. Debris. Through the years the people have regarded the river as a means of getting rid of anything they did not want.

Faced with the pollution load, the results of the laboratory work becomes of interest.

First, let's take a look at the bio-chemical oxygen demand. The highest BOD occurred on June 10, 1963, when the average for the Main Street Bridge was 4.29 ppm at 2 foot depth; 2.52 ppm at 38 foot depth; and, 3.56 ppm at 73 foot depth. On February 12, 1968, the BOD exceeded 2.0 ppm two times out of 42 samples. These values were 2.2 and 2.4 ppm. The low BOD for this day was 0.8 ppm. Generally, throughout our long term sampling, the BOD is less than 2.0 ppm.

Second: Dissolved oxygen. On February 12, 1968, the percent saturation of dissolved oxygen was a low of 77% (8.0 ppm) and a high of 88% (9.3 ppm).

Third: The most probable number of coliforms (MPN). The lowest logarithmic average of 4,414 occurred on May 22, 1955, and the highest of 41,132 occurred on December 14, 1959.

Fourth: Chlorides. We check for chloride as an index of mixing and to determine the percent saturation of dissolved oxygen. Chlorides have ranged from a low of 54 ppm at 11:00 a.m. on October 14, 1957, to a high of 14,900 at 3:00 p.m. on February 12, 1962. There is intense mixing in the St. Johns and the salt water tongue of tidal estuaries is not pronounced. The difference in chlorides from top to bottom is generally in the range of a few hundred parts per million.

Fifth: Color. The popular opinion in Jacksonville is that the color of the St. Johns is caused by the raw sewage and that the river will be as clear as Silver Springs when the sewage is removed and treated. The color is due to the organics from the drainage basin and runs from 60 to 100 apparent color on the platinum cobalt scale.

The above five items refer to the Main Street Bridge (Station 5).

The City has had a cooperative agreement with the United States Geological Survey since 1954 for flow measurement at the Main Street Bridge. The flow measurement shows wide variability. An average of 20 billion gallons of water moves under the Main Street Bridge each day. I grant you that some of these gallons are the same gallons but there is this much water in motion.

I have tried to give you an idea of the variability of some of the parameters.

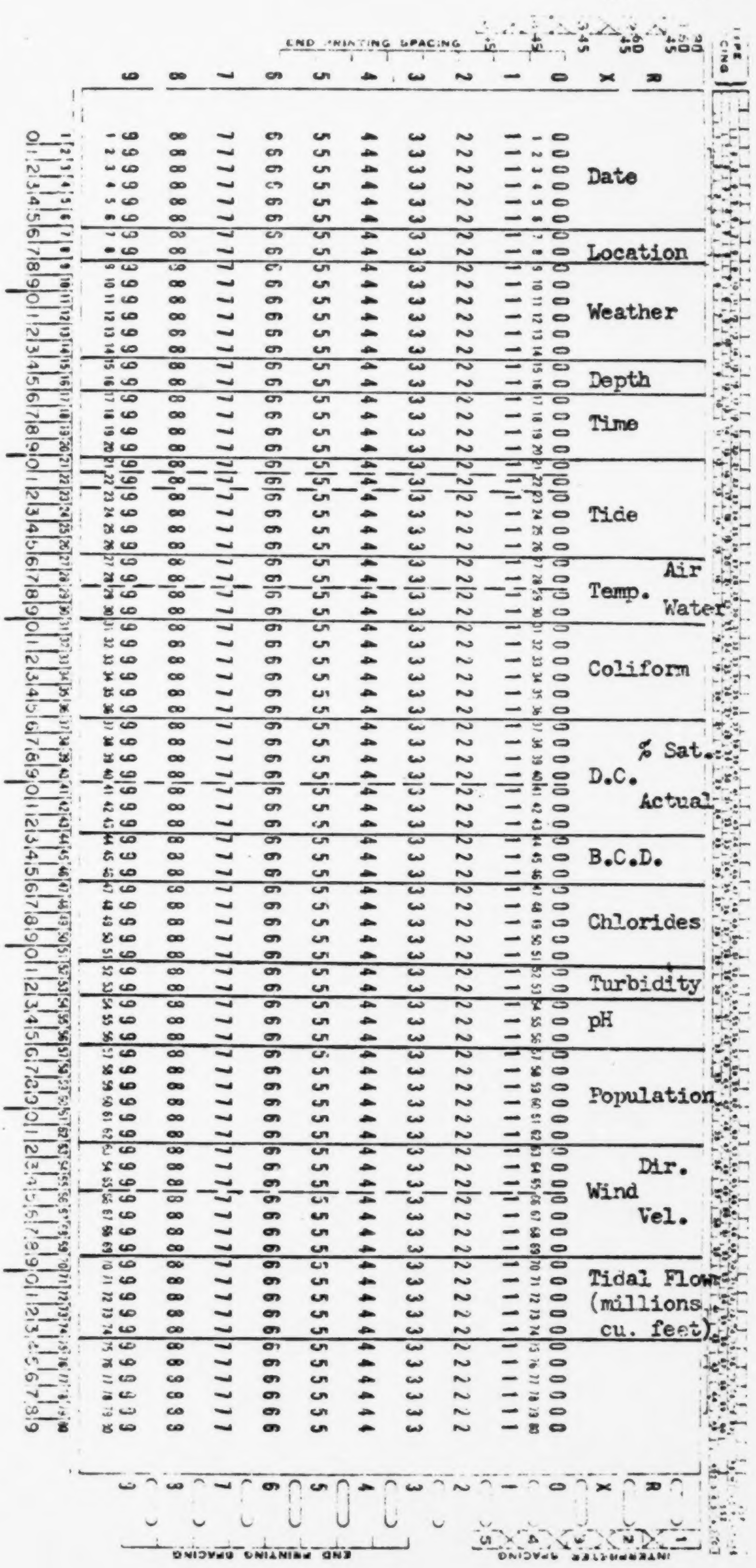
We have done a lot of work and accumulated a lot of data. We have contacted various computer manufacturers to see whether they had a "canned" program that we could plug the data into, but this was not available. We have offered the use of this data to the University of Florida for use by a master's or doctoral candidate. We have furnished one year's data to the Water Pollution Control Administration. We have all of this data and more on punched cards. (the card example is attached.)

My purpose in being here today is:

1. To offer the cooperation of the City of Jacksonville in any studies of the St. Johns Estuary by state or federal agencies.
2. To offer the accumulated data to state and federal agencies.

3. To suggest research in possible repellency effect on fish by industrial waste.

4. To suggest research and studies of current and motion in the St. Johns Estuary.



Field	(Example)
Date	12 10 62
Location	05
Weather	Not Punched
Depth	38
Time	1000
Tide	E + 0.65
Temp. Air	6
Temp. Water	12
Coliform	23000
D.C. % Sat.	94%
D.C. Actual	9.7
B.C.D.	2.5
Chlorides	4800
Turbidity	33
pH	7.5
Population	199000
Wind Dir.	WNW
Wind Vel.	9.3
Tidal Flow (millions cu. feet)	2920

Program Name St. Johns River Pollution Survey Program Number ______ Card Name ______

Electro No ______ Card Color ______ Stripe ______ Estimated Volume ______

CITY AUDITOR'S OFFICE, CITY OF JACKSONVILLE, FLORIDA

[illegible]

WALTON COUNTY

Chamber of Commerce

Telephone TW 6-2411 Area Code 904
DeFuniak Springs, Florida 32433
Post Office Box 29

March 7, 1968

Federal Water Pollution Control Administration
United States Department of Interior
Atlanta, Georgia 30309

Gentlemen:

Pursuant to the comprehensive study of pollution problems in the nation's estuaries being conducted by the Department of Interior pursuant to the Clean Water Restoration Act of 1966 the following is submitted in relation to Walton County, Florida.

Walton County, Florida has been blessed by nature with a large bay area and river together with their multiple bayous and streams which afford one of the finest outdoor recreational natural facilities in the southeastern United States. During the past few years public and commercial use of these water resources have begun to multiply at an accelerated pace by persons, farms and corporations from many of the states in the southeastern United States.

Particularly noted has been the boom in water front housing construction and the increase in the use of the Choctawhatchee Bay and river by commercial fishing boats and private pleasure and fishing boats. Industrial utilization of the bay area, river and streams has not in the past developed with the same impact as felt in other areas of the country, however feasibility studies by industry are beginning to take place and inquiries concerning port facilities for commercial transportation of industrial products have begun to swell in our county.

While these growing activities are readily observed there has been no facility or project incident to same made available to conduct a study of the situation in order to adopt and establish sound pollution prevention practices before damage accrues to a marine life and clean water recreational facilities so bountifully offered in our area.

The Walton County Chamber of Commerce and Health Department feel that such a study would greatly enhance control of residential sewage, individual and collective systems with particular attention to all new construction, proper action to prevent

FACTS ABOUT WALTON COUNTY: Population: 1960: 16,700 - Elevation, 345 Ft. (Highest Point in Florida) Churches, to meet every Religious Demand - Location: 80 Miles East of Pensacola on U. S. Highways 90, 98, 331. 30 Miles Frontage Gulf of Mexico Miracle Strip, North to Alabama Line - Average Annual Temperature 67.9 Degrees. Average Monthly Rainfall 4.61 Inches - Incorporated Towns: DeFuniak Springs: 5,850, County Seat of Walton County, Freeport: Oil Terminal, Paxton: State Livestock Market.

stream and estuary pollution from the vastly increased boating, private and commercial, and effective surveillance on new industrial development to plan adequate waste control before construction, and the necessity and feasibility of development of adequate solid waste disposal programs which will provide an alternative to indiscriminate dumping of garbage and debris in said areas.

While specific findings would necessarily result only from the comprehensive study by trained personnel in the field of water pollution some of the general facts observed are as follows: Industrial wastes together with some public sewer disposals are dumped in the Choctawhatchee River as far North as Columbus, Georgia; human waste and general sewage disposal implemented indiscriminately along the banks and shores of the river, bay and stream areas; hundreds of pleasure and commercial motor craft operating on any given day which appeared to be doubling each year for the past few years.

It is the inescapable conclusion reached by this organization that unless a proper and meaningful study is made of the situation within the near future there will be little or no effective practices adopted to hold in check and prevent future growing pollution of our county's greatest assets, to-wit: Its abundant natural water resources which provide increasing numbers of people with wholesome clean recreational facilities from a wide state area.

Respectfully submitted,

Patricia A. Potter
Secretary-Manager

3-13-68

On behalf of the Orange Audubon Society let me express delight at the manner in which these hearings have been conducted and with the general tenor of the preponderence of the testimony presented. It is most encouraging to discover just how great is the pressure for sensible public control of our estuarine resources.

Following as I do in the wake of so many men and women who have presented a wealth of technological and scientific data, it is apparent that my own limited knowledge will enable me to present information of a very elementary sort that would at best be redundant.

Let me instead make several brief comments that I feel will express the general attitude of the Orange Audubon Society toward some of the problems being discussed.

First, to any intelligent person listening to the testimony presented by men and women whose credentials qualify them as experts in the matters under consideration, it becomes obvious that our lack of knowledge about the harm that may be occasioned by tampering with estuarine resources fairly cries out for caution. Time and again during these past two days we have heard fear expressed about the effects of certain uses of our estuaries. Coupled with the expressions of concern has been the bluntly stated opinion of several scientists that once destroyed,our estuaries cannot be returned to their former condition - that such condition may well be the result of a delicate balance achieved over a period of a million years.

Under the circumstances a Moratorium on the use of estuarine zones needs to be declared promptly.

Second, an extensive research program into the effects of all kinds of estuarine pollution and control thereof needs to be initiated as rapidly as possible. Such research should be aimed at producing the information required to enable us to make the wisest possible use of our estuaries.

Third, our estuarine resources need to be carefully cataloged and a system of zoning established. If there are demands to be made on the estuaries that will alter them,such demands should be made at locations where the resultant damage will be minimal.

Fourth, recognizing that the pressures for unwise use of natural resources manifest themselves at the local level in thousands of places at once, it is obvious that strict Federal Standards are requisite. Only in this way can unwise actions on the part of state or local officials be precluded with any degree of certainty. National policy can and should over-ride actions which may appear to be in the temporary interest of any group of Floridians.

Such national policy may well best be implemented on the local level, but National policy it should be!

Finally, at least once during these hearings, I have heard someone attempt to justify dispoiling our estuarine resources on the basis of economics. Ignoring the nonsense of such "economics" one cannot help but be shocked by such an attitude.

When we talk about estuaries, we are talking not only about a nursery for a wide variety of acquatic life which supply man with much wholesome and tasty food. We are also talking about esthetics. We are talking about a place of supreme importance for many other kinds of wildlife that help make Florida the beautiful and fascinating place it is.

The kind of search for profit that would deprive us of some of the State's most beautiful birds, for instance, is appalingly short-sighted.

What makes Florida unique is not its power plants or its industries. People don't come here to find these things. They come here instead to enjoy our sunshine and our wealth of natural resources, of which our estuaries are an important part.

Destroy these and much of the beauty in our lives will disappear, never to return.

In the name of the people of Florida - In the name of future generations - In the name of common sense, we cannot allow this to happen.

Statement of Harold E. Scott
for the
Orange Audubon Society

March 11, 1968

To The Federal Water Pollution Control Administration

My Dear Mr. Thoman:

Thank you for your letter inviting me to attend the meeting in Orlando March 12th and 13th at The Park Plaza Hotel regarding The National Esturine polution study, and thank you also for the comprehensive material enclosed

It is with deep regret that I cannot do so but am sending this letter instead.

Due to the situation that I am not a specialist of any kind, my facts must be predicated on the knowledge of others -- and my thirty years of observation here in Martin County.

As a conservatist connected with many organizations, my testimony must endeavor to give to you the voice and ideas of many of the inhabitants, for there is a momentous serge of indigation and protest over what hastranspired in the past which certainly must have been communicated to all agencies and political bodies.

I will divide my paper under the headings of Siltation, Back Pumping, Bulkhead Lines, Thermal Pollution, and the possibility of I95 Highway dividing the Jonathan Dickinson Park .

1. Under Bulkhead Line-there is a strong need for the same line on all coastal areas, no further baywood than the mean high water mark. This would help to preserve the whole estural complex.

At present the Bulkhead Line is arrived at through the County Commissioners. Each area differs according to the pressure exerted. The importance of the Bulkhead Line is connected with dredge and fill operations. The economic value of the Bay Bottoms and marshes are entwined in that

1. It has been proven beyond a doubt that an acre of Bay Bottom land can yield more per acre than dredge and filled land. The dredge and filled land can only add to the individual's taxes.

2. If The Bulkhead Line is kept at the mean high water level, the valuable mangroves and other esturine areas will trap the food material for fish and be a haven for the fish besides.

3. The Mangrove hold the land which aid and saves it from the pollution of siltation.

This siltation that covers our bays and rivers and, in turn, denies the fish the food to keep them in that area and the oxygen to keep them alive.

The water from Lake Ochochobee runs through our St. Lucie Locks and create a brackish water in the North and Souxth Fork of The St. Lucie River, as well as the main body itself.

First, for years we fought the problem of the millions of gallons of fresh water flowing down our St. Lucie River each day, carrying the pollution of siltation with it to the ocean. This problem was fought through every court in the land. I say now that the County has taken the blunt of the flood waters long enough. We want the Corpse of Enginerrs, The Florida Flood Control, those in charge of all our bottom lands to protect this area for the future inhabitants. No more do we want to see the fresh water kill of crabs, shellfish, and forage fish.

We have been known as the Sailfish capital of the World. Let's see what we had.

1. Grounded boats on the way to the Palm City bridge from the St. Lucie Locks.
2. Caving in of canal sides due to not slanted areas which should have been planted.
2. Six to ten feet of silt in the lower area of the St. Lucie River near the bridge.
4. Deep holes filled.
5. Muddy waters where 30 years ago Tarpon jumped in profusion in front of The Sunrise Inn, and where the water resembled the Meditterean in Europe, and where one could see the fish take your lure or bait.
6. Birds were plentiful everywhere, but not now.
7. no Fish

In order to partically rectify such a condition, Back Pumping is needed in the canals and a rate of flow to be regulated according to studies by the Fish and Wild Life Service and The Florida Game and Fresh Water Fish Commission. To my knowledge this plan is not yet authorized or funded by the U. S. Congress, but I believe is ready for forwarding to our Congressional delegation.

5. Martin County has been blessed with a magnificent and varied fishing area and I am sure we can bring it back with help, for if the Ruhr Valley in Germany can come back after their great pollution and make their River fit for bathing, then nothing is impossible.

Regarding the City of Stuart, I have a great deal of praise for their endeavors to bring good water to not only the City, but the outlying district, as well as their endeavor to correct pollution areas. I cannot say as much for the County for there are spots where in sub-divisions the lots are 50 ft. apart and the wells and cesspools too near together. Many are below water level which, of course, adds to the pollution of the River, particularly the Indian River area and the North Fork of The St. Lucie. This all takes time to correct but pollution gathers momentum and does not lessen.

Further up the Indian River, between St. Lucie County and Martin County, a possible threat in future thermal pollution has come to light, where the Public Service may build an atom plant on 1200 acres from the ocean to the River. Here we are concerned with the intake, outgo and heat of the water, and its effects on using 1,800,000,000 gallons of water a day. We are also concerned with such action on a usual placid river of spawning trout, when inhabitants come from over the State to fish.

The possible proposed route of I95 through the Jonathan Dickinson Park would have eliminated a famous fresh water creek called Kitchen Creek, two proposed Bass Ponds, and taken out the Boat Ramps near where the public bathe in the Loxahatchee River. This road would stop the flow of water and create stagnant areas.

The people in our area well know of the sinkhole of the Fort Lauderdale Inland Waterway, and the portion of Lake Worth where doctors have forbidden their patients to bathe or water ski. This, I am sure, is due to bad management of our resources, and we want no part of it.

70% of the inquiries for homes and places to live come to Florida from Doctors, Lawyers, factories, etc., all because they desire the fishing, weather, camping, and boating =- all of which runs into billions of dollars a year. The tourist is an important figure in our economy and whether they are scoffed at as old ladies or bird lovers, I ask you to listen to them, for they at present are the solid backbone of Florida.

However, a change has taken place. No longer are the protestors without proof and facts for they have the opinion of Biologists, Ecologists, and Agencies to aid them with advice. Then we believe we must be listened to but what remains is whether our advice will be taken.

Do you know that

356 families per week settle in Florida
182,000 families will be needing homes and land

1,800,00 new homes will be needed in ten years
One-half million acres of land will be needed to supply the above
One million acres will be drawn from our supply of open natural lands to support this influx
Increased air-pollution will mar the air and diminish the clarity of the sky
Water pollution will incur, putting more and more strain on the absorption potentials of soil and fresh water

If the above is true, then time is of great importance for we cannot wait too long to save and restore some of our natural resources.

Respectfully submitted,

Virginia R Forrest

Virginia R. Forrest
Director of Florida Audubon Society

STATEMENT OF FLORIDA BOARD OF CONSERVATION
ON NATIONAL ESTUARINE POLLUTION
TO
FEDERAL POLLUTION CONTROL ADMINISTRATION

ORLANDO, FLORIDA   MARCH 13, 1968

By RANDOLPH HODGES, DIRECTOR

THE FLORIDA BOARD OF CONSERVATION WELCOMES REPRESENTATIVES OF THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION TO OUR STATE. WE APPRECIATE YOUR CONCERN IN MATTERS RELATING TO POLLUTION CONTROL AND WATER QUALITY ENHANCEMENT IN ESTUARINE AREAS. YOUR CONCERN IS ALSO OUR CONCERN AND WE HOPE THAT YOUR AGENCY AND THE APPROPRIATE STATE AGENCIES OF FLORIDA CAN WORK TOGETHER SATISFACTORILY IN RESOLVING THE IDENTIFIED PROBLEMS IN THESE AREAS OF RESPONSIBILITY.

STATE AGENCIES ASSIGNED RESPONSIBILITIES BY FLORIDA LAW TO PROTECT, DEVELOP AND MANAGE THE WATER RELATED RESOURCES OF THE STATE ARE REPRESENTED AT THIS CONFERENCE. WE ARE NOT ONLY ANXIOUS TO HEAR OF ANY WATER RELATED PROBLEMS THAT MAY BE SUGGESTED HERE FOR CONSIDERATION, BUT WE ARE PLEASED TO BE ABLE TO GIVE YOU A SUMMARY REPORT ON THE MANY AREAS THAT HAVE BEEN OF CONCERN TO THE STATE. IN SOME OF THESE AREAS WE CAN REPORT NOTEWORTHY PROGRESS; SOME ARE AREAS WHERE WE ARE NOW APPLYING GREAT EFFORT; AND SOME ARE AREAS WHERE WE MAY BE ABLE TO PROGRESS MORE RAPIDLY IN COOPERATIVE OR JOINT EFFORTS WITH YOUR AGENCY. THERE ARE SOME AREAS WHERE WE WILL APPRECIATE RECEIVING YOUR ATTENTION AND THERE ARE OTHER AREAS OF STATE RESPONSIBILITY WHERE YOUR ADVICE OR SUGGESTIONS MAY BE WELCOMED TO ASSIST IN THE EXECUTION OF OUR RESPONSIBILITY.

FLORIDA IS NORMALLY A WATER CONSCIOUS STATE. THE STATE RESIDENTS EARLY RECOGNIZED THAT OUR EXISTENCE AND OUR FUTURE DEPEND ON THE WISE USE AND GOOD MANAGEMENT OR CONSERVATION OF OUR WATER RESOURCES. STATE LEGISLATIVE ACTIONS HAVE PROBABLY BEEN MORE CONSPICUOUS IN THIS AREA OF RESPONSIBILITY THAN IN ANY OTHER SINGLE AREA OF RESPONSIBILITY OF STATE GOVERNMENT. THE LEGISLATURE AND THE AGENCIES OF STATE EXECUTIVE GOVERNMENT HAVE BEEN ALERT TO ALL MATTERS OF IMPORTANCE RELATIVE TO WATER AND HAVE FOLLOWED THE SOUND ADVICE OF RECOGNIZED AND QUALIFIED PROFESSIONAL ENGINEERS AND EXPERTS ON WATER MATTERS.

PRACTICALLY ALL WATER RELATED RESPONSIBILITIES OF THE STATE ARE COORDINATED AND SUPERVISED AT STATE GOVERNMENT LEVEL IN ONE AGENCY TO ASSURE IMPLEMENTATION OF A UNIFIED POLICY OF DEVELOPING AND MANAGING THE WATER RESOURCES OF THE STATE FOR THE MAXIMUM REASONABLE AND WISE USE FOR ALL THE PEOPLE OF THE STATE. TO ACHIEVE THIS END, THE RESPONSIBLE STATE AGENCIES HAVE COOPERATED WITH THE FEDERAL AGENCIES CONCERNED IN ALL MATTERS OF DEVELOPMENT AND USE OF THE WATER RESOURCES. WE ARE ANXIOUS AND WILLING TO HEED THE ADVICE OF FEDERAL AGENCIES AND OTHER EXPERTS IN THIS FIELD.

BECAUSE OF THE RAPID AND TREMENDOUS GROWTH IN POPULATION AND EXPANSION OF THE ECONOMY OF FLORIDA, THERE WILL CONTINUE TO BE AN EVER-INCREASING DEMAND FOR USE AND CONSERVATION OF FRESH WATER IN THE STATE AND FOR DEVELOPMENT OF MARINE ORIENTED COMMERCIAL FACILITIES IN THE FORM OF SALT WATER FISHERIES, PORTS, NAVIGATION CHANNELS AND WATERWAYS, AS WELL AS EXPANDED REQUIREMENTS FOR RECREATIONAL FACILITIES ON BOTH FRESH AND SALT WATERS OF THE STATE.

IN MEETING THESE GROWING REQUIREMENTS OF INDUSTRY, COMMERCE, URBAN DEVELOPMENTS, AND RECREATION FOR THE EXPANDING POPULATION OF THE STATE, FLORIDA IS FORTUNATE IN THAT THE STATE LEGISLATURE HAS PLACED RESPONSIBILITY FOR DEVELOPMENT, USE AND CONSERVATION OF THESE MANY INTER-RELATED WATER RESOURCES, INCLUDING BEACH AND SHORE PROTECTION, WATERWAYS DEVELOPMENT, GEOLOGY, WATER RESOURCES AND CONSERVATION, SALT WATER FISHERIES AND MARINE BIOLOGY, ALL WITHIN ONE STATE AGENCY, THE FLORIDA BOARD OF CONSERVATION, UNDER DIRECT SUPERVISION AND CONTROL OF THE HIGHEST LEVEL OF STATE EXECUTIVE GOVERNMENT: THE GOVERNOR AND CABINET OFFICERS OF THE STATE WHO COMPRISE THE BOARD OF CONSERVATION. UNDER THIS ARRANGEMENT WE ARE ABLE TO WEIGH THE MANY FACTORS BEARING ON THE DEVELOPMENT, MANAGEMENT, AND USE OF THESE RESOURCES, AND IN CONSIDERATION OF THE ECONOMIC AND SOCIAL NEEDS OF THE TIME, TO ARRIVE AT SOLUTIONS THAT ARE IN THE BEST OVERALL LONG-RANGE INTEREST OF THE TOTAL PUBLIC NEEDS.

MATTERS OF PRIMARY CONCERN TO THE STATE AND THE NATION, AS RELATING TO USE AND CONSERVATION OF THE ESTUARIES IN FLORIDA, ARE DISCUSSED IN OUTLINE FORM HEREIN, UNDER RELEVANT SUBJECT HEADINGS.

WATER RESOURCES AND CONSERVATION

ONE VITAL FUNCTION THAT ESTUARIES MUST SERVE IS THE DISTRIBUTION OF FLOOD WATERS, PARTICULARLY THOSE COLLECTED IN FLOOD CONTROL PROJECTS. LACK OF ADEQUATE STORAGE AREAS TO HOLD FLOOD WATERS MAKES IT MANDATORY TO PROVIDE FOR SOME OF THESE DISCHARGES THROUGH THE ESTUARIES SO THIS REQUIREMENT MUST BE RECOGNIZED IN ALL ESTUARY PLANNING TO INCLUDE THE WATER QUANTITIES AND CONVEYANCE FACILITIES. FLOOD DISCHARGES ARE BEING MINIMIZED BY HOLDING OR BACK PUMPING INTO STORAGE AREAS, BUT SOME FLOOD WATERS WILL HAVE TO BE DISCHARGED THROUGH ESTUARIES IN YEARS OF EXCESSIVE PRECIPITATION. THIS IS A MATTER OF CONCERN THAT STATE AGENCIES ARE ALREADY WORKING IN FULL COORDINATION WITH RESPONSIBLE FEDERAL AGENCIES AND REQUIRES NO ADDITIONAL CONSIDERATION BY ANY OTHER AGENCY.

FRESH WATER IS NEEDED FOR MAINTAINING BRACKISH CONDITIONS SO ESSENTIAL IN ESTUARIES FOR SPAWNING AND FEEDING. PERHAPS THIS FRESH WATER COULD BE SECURED FROM THE MINERALIZED WATERS IN SOME

OF OUR DEEP AQUIFERS WHICH CANNOT BE USED FOR AGRICULTURAL OR MUNICIPAL NEEDS. SUCH MINERALIZED WATER MIGHT BE USED DURING DROUGHT PERIODS FOR ESTABLISHING THE PROPER SALINITY LEVELS IN THE ESTUARIES INSTEAD OF USING THE CRITICALLY SHORT FRESH WATER. THIS WATER CONSERVATION POSSIBILITY DESERVES RESEARCH AND STUDY.

THE POSSIBILITY OF CONVERTING SOME PORTIONS OF ESTUARIES TO FRESH WATER LAKES TO PROVIDE RESERVOIRS MUST BE CONSIDERED IN FLORIDA BECAUSE OF THE LACK OF FRESH WATER STORAGE RESERVOIRS SO ESSENTIAL TO PROTECTION AGAINST SALT WATER INTRUSION IN SOME HIGHLY DEVELOPED AREAS. SUCH FRESH WATER CONSERVATION PROPOSALS MUST BE FULLY EVALUATED TO RECOGNIZE THE IMPORTANCE OF BOTH THE ESTUARIES AND THE FRESH WATER STORAGE REQUIREMENTS. WITH THE ABUNDANCE OF ESTUARY AREAS AND THE RELATIVE FEW SITES WHERE FRESH WATER IMPOUNDMENT COULD BE CONSIDERED, THIS SHOULD NOT CAUSE A PROBLEM EXCEPT IN EMOTIONAL CONFLICTS WHEN THE FACTS ARE NOT FULLY UNDERSTOOD.

THE POSSIBILITY OF SALT WATER INTRUSION INTO FRESH WATER AQUIFERS FROM ESTUARIES THROUGH STREAMS OR CANALS DEMANDS CONSTANT SURVEILLANCE AND SOMETIMES REQUIRES SALT WATER BARRIER STRUCTURES. HERE AGAIN IS A CAREFUL BALANCING OF THE NEEDS OF THE ESTUARIES AND THOSE OF THE FRESH WATER SOURCES. THIS SITUATION IS BEING CONSTANTLY STUDIED BY ALL STATE AND FEDERAL AGENCIES CONCERNED AND REQUIRES NO ADDITIONAL ATTENTION.

SALT WATER FISHERIES

A NUMBER OF CIRCUMSTANCES, BUT PARTICULARLY AN UNUSUALLY FAVORABLE COMBINATION OF GEOGRAPHICAL AND METEOROLOGICAL FEATURES, HAVE MADE FLORIDA'S ESTUARIES POTENTIALLY THE MOST PRODUCTIVE IN THE UNITED STATES. OUR SCIENTISTS EARLY RECOGNIZED THAT, IF THESE IMMENSE RESOURCES WERE TO BE PROPERLY MANAGED AND PROFITABLY USED, PROLONGED, INTENSIVE AND SERIOUS STUDY WOULD BE REQUIRED.

AFTER THE SECOND WORLD WAR, INVESTIGATIONS WERE SPONSORED BY THE FLORIDA BOARD OF CONSERVATION IN THE THEN FLEDGLING MARINE LABORATORY OF THE UNIVERSITY OF MIAMI. THESE GREW IN NUMBER AND SCOPE UNTIL, IN SPETEMBER OF 1955, THE BOARD OPENED ITS OWN LABORATORY IN ST. PETERSBURG. DURING THE ENSUING THIRTEEN YEARS, THE STATURE OF THE SCIENTISTS THAT WORKED THERE AS WELL AS THE PRODUCT OF THEIR LABORS, ESTABLISHED THIS INSTITUTION AS THE FOREMOST CENTER OF ESTUARINE STUDIES IN THE WORLD. YEAR AFTER YEAR THE TREATISES, REPORTS, ARTICLES, PAMPHLETS, JOURNAL PAPERS AND BOOKS GAVE DRAMATIC EVIDENCE OF THE GREAT WEALTH THAT LIES BENEATH OUR SHALLOW COASTAL WATERS IN AND ABOUT THE RICH AREAS WHERE FRESH WATER COMINGLES WITH THE OCEANIC MASSES.

THE AREAS NEAR RIVER MOUTHS ARE ECONOMIC GIANTS FROM MANY STANDPOINTS AND FREQUENTLY THE GREATEST VALUE OF A PARTICULAR USE IS DERIVED AT THE EXPENSE OF ANOTHER RESOURCE. SO, COMPETITION AND CONFLICT CHARACTERIZE THE ADMINISTRATION AND MANAGEMENT OF THE VAST ENTERPRISES OF OUR ESTUARIES.

AS A RESULT, THE REGULATION, CONSERVATION AND WISE USE OF OUR UNDERWATER HERITAGE HAS BEEN SLOW IN MANY CASES AND USUALLY LESS THAN PERFECT. BUT THE PUBLIC HAS BEGUN TO REALIZE THAT A CONTINUED USE OF THEIR RESOURCES WILL DEPEND UPON THE PROTECTION RECEIVED. IN THE LAST SESSION OF THE FLORIDA LEGISLATURE, FOR INSTANCE, AN ACT WAS PASSED THAT REQUIRES A CONSIDERATION OF CONSERVATION IN ANY APPLICATION FOR A COASTAL DEVELOPMENT. DREDGING AND FILLING WILL HENCEFORTH BE OBLIGED TO PROCEED ALONG LINES CALCULATED TO PRESERVE THE VALUABLE NURSERIES AND SANCTUARIES THAT ARE SO VULNERABLE IN ESTUARIES.

INASMUCH AS OUR OWN SCIENTISTS ARE PREEMINENTLY QUALIFIED TO PROVIDE THE FACTUAL INFORMATION NEEDED TO PROPERLY DESIGN PROTECTIVE MEASURES, THERE IS CERTAINLY NO NEED FOR FEDERAL BIOLOGISTS, FAR LESS VERSATILE AND COMPETENT TO DEAL WITH OUR WATERS, TO GIVE OBLIGATORY CONSULTATION OR PRESCRIBE STANDARDS OF MANAGEMENT.

ON THE OTHER HAND, WHEN THE PLANS FOR REGULATION THAT ARE PRODUCED IN OUR LABORATORIES ARE NOT FOLLOWED, JOINT ACTION INVOLVING MORE THAN ONE LEVEL AND/OR BRANCH OF GOVERNMENT MAY BE DESIRABLE. BUT THIS COOPERATIVE EFFORT SHOULD BE INITIATED BY THE STATE, NOT IMPOSED FROM WASHINGTON.

IN ORDER TO GIVE SOME MEASURE OF THE MAGNITUDE OF THE RESOURCES WE IN FLORIDA PRESENTLY ENJOY (AND GREATER USE AND VALUES MAY BE EXPECTED EACH YEAR), WE ATTACH HERETO A COPY OF COMMERCIAL LANDINGS FOR 1966 AND A REPRINT OF A REPORT ON THE SPORTS FISHING INDUSTRY PRINTED IN 1958. THE MONETARY VALUES OF THE LATTER ARE THREE TO FOUR TIMES THOSE CITED (EVEN WITHOUT REFERENCE TO HEALTH OF THE PARTICIPANTS AND REBUILDING OF HUMAN VIGOR THAT WERE AFFECTED BY THE ACTIVITIES). ROUGHLY, THE SPORTS FISHING ENTERPRISE IS WORTH AT LEAST 500 MILLION DOLLARS ANNUALLY TO THE ECONOMY OF OUR STATE.

THE RELATIVELY SMALLER VALUES SHOWN FOR THE COMMERCIAL FISHING INDUSTRY ARE UNFAIRLY MINIMIZED BY THE METHOD OF APPRAISAL. DUE TO PRACTICALITY, ALL FISHING PRODUCTION STATISTICS HAVE HISTORICALLY BEEN GATHERED AT THE POINT OF LANDING, SO REFLECT THE PRICE PAID TO THE FISHERMEN. BUT THE VALUE (NOT SHOWN IN THE REPORT) INCREASES EACH TIME THE PRODUCT IS HANDLED, ICED, CLEANED, PROCESSED, BREADED, FROZEN OR PACKAGED. THE FINAL VALUE OF THE INDUSTRY, ECONOMICALLY, IS THE PRICE PAID BY THE CONSUMER.

ACCORDINGLY, THE COMMERCIAL FISHING INDUSTRY IS WORTH, AT LEAST, 150 MILLION DOLLARS A YEAR TO OUR ECONOMY.

ALSO ATTACHED ARE LISTS OF PUBLICATIONS THAT INCLUDE MANY OF THE OVER 250 ITEMS THAT HAVE BEEN BROUGHT OUT WHICH REFLECT OUR CAPABILITIES IN DEALING WITH ESTUARINE PROBLEMS. OTHER LISTS MIGHT BE MADE AND WOULD INCLUDE ADDITIONAL ITEMS, BUT THE TWO CATALOGUES WE ATTACH WILL INDICATE THE SCOPE OF OUR ACTIVITIES IN THIS AREA. AN UP TO DATE LISTING OF SCIENTIFIC PUBLICATIONS OF THE FLORIDA BOARD OF CONSERVATION PERTAINING TO SALT WATER FISHERIES AND RESEARCH, ALL RELATING TO ESTUARINE PROBLEMS AND CONSIDERATIONS IS BEING COMPILED FOR REFERENCE AND WILL BE FORWARDED, WHEN COMPLETED, TO THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION.

WE STAND READY TO APPLY OUR TECHNICAL PROFICIENCY TO ANY PROBLEM THAT MAY DEVELOP RELATING TO OUR VAST BRACKISH WATER REGIONS AND TO COOPERATE WITH ANY PERSON, FIRM OR GOVERNMENTAL ENTITY THAT IS INTERESTED IN DEVELOPING AND PROTECTING ESTUARIES. AFTER ALL, WE KNOW BETTER THAN ANYONE ELSE THEIR GREAT VALUE.

BULKHEADING, DREDGING, FILLING AND SILTATION AREAS

ESTUARIES MAY BE USED FOR SPORT AND COMMERCIAL FISHING; GENERAL RECREATION; INDUSTRIAL COOLING; EXTRACTION OF PETROLEUM, NATURAL GAS AND SHELL; DEPOSITION OF EFFLUENTS; NAVIGATION AND TRANSPORTATION; PORTS AND HARBORS; HOMESITES; AND INDUSTRIES. MULTIPLE USES AND USERS FREQUENTLY CAUSE COMPETITION, PROBLEMS AND CONTENTION. DREDGING AND FILLING TO CONVERT SHALLOW SUBMERGED LAND INTO PROFITABLE WATERFRONT REAL ESTATE HAS CAUSED THE MAJOR CONSERVATION CONTROVERSY IN FLORIDA.

SHALLOW SUBMERGED LAND FILLED REPRESENTS THE CONVERSION OF MARINE ENVIRONMENT INTO UPLAND. SHALLOW SUBMERGED LAND DREDGED REPRESENTS THE LOSS OF SEAGRASS BEDS, MARINE SOILS, SHELLFISH AND FISHING GROUNDS, AND OVERALL MARINE PRODUCTIVITY. ADDITIONAL SUBMERGED ACREAGE, NEITHER DREDGED NOR FILLED, MAY BE AFFECTED BY RESULTANT SILTATION THAT CAN SMOTHER MARINE LIFE.

WITHOUT OR DESPITE CONSERVATION SURVEYS AND REPORTS, 22,551 ACRES OF SOVEREIGNTY SUBMERGED LANDS WERE SOLD BY THE STATE OF FLORIDA FROM 1955 THROUGH 1965. OTHER LARGE SALES OF SUBMERGED LAND WERE MADE IN THE 1920'S. MOST OF THESE SALES LED TO DREDGING AND FILLING TO CREATE WATERFRONT REAL ESTATE, PRATICULARLY IN SOUTH FLORIDA, WHERE URBAN GROWTH HAS BEEN CONCENTRATED SINCE WORLD WAR II.

TO CONTROL THE USE OF BAY BOTTOMS AND PREVENT CONTINUED DAMAGE TO THE ESTUARIES OF THE STATE, THE 1967 SESSION OF THE FLORIDA LEGISLATURE PASSED THE RANDELL BILL THAT AMENDS THE STATE BULKHEAD ACT AND REQUIRES CONSERVATION SURVEYS AND REPORTS FOR ALL PRIVATE AND PUBLIC APPLICATIONS INVOLVING BULKHEAD LINES, SUBMERGED LAND PURCHASES, AND DREDGE-FILL PERMITS. BEFORE THE STATE, CITIES, OR COUNTIES ACT, THE APPLICANT MUST HAVE IN HAND A CONSERVATION SURVEY AND REPORT, THAT ADVISES HIM OF ANY POTENTIAL ADVERSE EFFECTS OF COASTAL DEVELOPMENT PROJECTS ON MARINE LIFE, HABITATS AND FISHERIES. FURTHERMORE, THE APPLICANT WISHING TO USE OR EXPLOIT SUBMERGED LAND MUST BEAR THE COST OF THESE CONSERVATION SURVEYS AND REPORTS.

TO COMPLEMENT THIS IMPORTANT NEW LEGISLATION, A STATE SYSTEM OF MARINE PRESERVES PATTERNED AFTER THE ONE ESTABLISHED IN ESTERO BAY WILL BE URGED TO THE NEXT LEGISLATURE. SUCH ESTUARINE AREAS INCLUDED WOULD BE INVIOLATE FROM URBANIZATION AND INDUSTRIALIZATION, BUT THE PUBLIC COULD CONTINUE USING THEM FOR SPORT AND COMMERCIAL FISHING AND GENERAL RECREATION.

IT APPEARS TIMELY TO PLAN AND ZONE FOR CONSERVATION AND ESTABLISH PRIORITIES IN USING THE ESTUARIES. SUCH FACILITIES AS MARINAS, NAVIGATION CHANNELS, POWER PLANTS AND PORTS NEED TO BE IN, OR ON, THE WATER, BUT INTRUSION INTO ESTUARIES OF EXPRESSWAYS, GOLF COURSES, AND SUBDIVISIONS WILL BE QUESTIONED BY THE STATE. SUCH ENCROACHMENTS MAY BE ALLOWED IN AREAS ALREADY BADLY DAMAGED AND BEYOND EARLY REHABILITATION, BUT UNSPOILED HABITATS SUPPORTING THE SPORT AND COMMERCIAL FISHERIES, NURSERY GROUNDS, AND THE BIRDS AND WILDLIFE HABITAT OF THE STATE SHOULD BE SAVED TO THE MAXIMUM REASONABLE EXTENT FOR ENJOYMENT OF FUTURE GENERATIONS. SUCH ZONING SHOULD NOT PERMIT ESTUARIES TO BE USED AS BORROW AREAS FOR CHEAP FILL MATERIAL OR AS DUMPING GROUNDS FOR THE UNDESIRABLE BY-PRODUCTS OF CITIES, FARMS AND FACTORIES. THESE ZONING CONSIDERATIONS ARE PLANNED TO BE TAKEN UP BY THE NEXT STATE LEGISLATURE.

POLLUTION OF ESTUARINE AREAS BY SHIPS

THERE ARE INADEQUATE STATE, FEDERAL AND INTERNATIONAL LAWS TO ENFORCE POLLUTION CONTROL MEASURES AND TO DELINEATE RESPONSIBILITIES FOR SHIPS THAT USE STATE PORTS AND SAIL THE INTERNATIONAL WATERS. ESTABLISHING STATE LAWS FOR ONE STATE WILL NOT SOLVE THE PROBLEM. THERE SHOULD BE A UNIFORMITY OF STATE LAWS, APPLICABLE TO EACH STATE, DEVELOPED FOR ENACTMENT BY EACH STATE LEGISLATURE, WHICH LAWS WILL APPLY WHEN SHIPS ARE WITHIN STATE WATERS AND PORTS. THERE SHOULD ALSO BE OTHER LAWS APPLICABLE TO THOSE SHIPS WHEN SAILING IN INTERNATIONAL WATERS WHICH WILL FIX RESPONSIBILITY FOR DAMAGES WITHOUT GETTING LOST IN THE INVOLVED INTERNATIONAL LAWS AND PROCEDURES NORMAL TO SHIP REGISTRATION AND OPERATION. THE F.W.P.C.A. COULD SERVE A WORTHWHILE PURPOSE BY SPONSORING SUCH ACTION, WITH PARTICIPATION BY THE STATES CONCERNED.

POLLUTION OF ESTUARINE AREAS BY BLOCKED INLETS

BAYS AND ESTUARINE AREAS LYING BEHIND BARRIER ISLANDS ARE DEPENDANT ON FLUSHING TO KEEP CLEAN BY AN EXCHANGE OF WATER BETWEEN THE BAY AND THE OCEAN. THE WATER PASSES THROUGH INLETS BETWEEN THE BAY AND THE OCEAN. THE FLUSHING ACTION OF THE HIGH AND LOW TIDES WILL CAUSE THE EXCHANGE OF WATER, PROVIDED THE INLETS ARE KEPT CLEAR OF ERODED MATERIAL FROM ADJACENT BEACHES. REMOVAL OF THESE BLOCKING SHOALS OF THE ERODED BEACHES FROM THE INLETS AND BAYS IS NECESSARY FOR THE BAYS TO FLUSH THEMSELVES. A SURVEY BY FEDERAL AUTHORITIES OF SOME SUCH AREAS MAY RESULT IN AN IMPROVEMENT IN SELECTED AREAS. SUCH ACTION COULD ALSO BENEFIT SHORES AND BEACHES BY REBUILDING THEM WITH THEIR OWN ERODED SAND.

W. F. O'Neill, President
Tampa Bay Engineering Co.

GENTLEMEN, I APPEAR BEFORE YOU TODAY AS THE CHAIRMAN FOR THE FLORIDA COUNCIL OF 100'S AIR AND WATER POLLUTION PREVENTION COMMITTEE. I HAVE ALSO BEEN ASKED TO REPRESENT THE CITY OF ST. PETERSBURG BY ITS MAYOR DON JONES AND MY OWN COMPANY, TAMPA BAY ENGINEERING COMPANY OF ST. PETERSBURG, FLORIDA.

OVER HALF OF THE POPULATION OF THE UNITED STATES IS CONCENTRATED IN ITS 24 COASTAL STATES. IT IS THESE COASTAL AREAS WHERE THE DEMAND FOR WASTE DISPOSAL FACILITIES IS GREATEST AND THE SPECTRE OF POLLUTION LOOMS THE LARGEST. IT IS THESE SAME AREAS TO WHICH THE POPULACE IS TURNING FOR MORE FACILITIES FOR RECREATION, MORE SWIMMING BEACHES, MORE BOAT-LAUNCHING RAMPS AND MARINAS, MORE SEASHORE PARKS, MORE GOOD FISHING SPOTS, AND MORE PLACES WHERE A MAN CAN JUST SIT AND WATCH THE SEA; YET THESE SAME AREAS ARE IN MANY STATES BEING TAKEN OVER BY AN UNPLANNED AND UNCONTROLLED EXPANSION OF ACTIVITIES WITH ABSOLUTELY NO CONCERN FOR PRESENT OR FUTURE RECREATIONAL USES. OUR ESTUARIES AND COASTAL MARSHLANDS CONSTITUTE AN ECOLOGICAL NICHE WHERE MANY OF OUR SPORT AND COMMERCIAL FISH SPECIES SPEND AT LEAST A PART OF THEIR LIFE CYCLE, YET THESE SAME ESTUARIES AND MARSHLANDS ARE CONSTANTLY BEING FORCED TO GIVE WAY TO THE ENCROACHMENTS OF CIVILIZATION WHILE THE UNITED STATES BETWEEN 1955 AND 1965 DROPPED FROM SECOND TO FIFTH PLACE IN COMMERCIAL FISH PRODUCTION. THESE SAME WATERWAYS ARE THE MARINE ROUTE TO OUR GREAT COASTAL

METROPOLITAN AREAS; YET FEW OF OUR SEAPORTS ARE MODERNIZED, TURN-AROUND TIMES ARE OVERLY LONG, PORT FACILITIES IN MANY PLACES ARE ANTIQUATED AND INEFFICIENT, AND FAR FROM BEING THE EXCITING AND COLORFUL WATERFRONTS OF A CENTURY AGO ARE NOW IN MANY CITIES THE AREAS MOST IN NEED OF URBAN RENEWAL, AREAS CAREFULLY AVOIDED BY ALL EXCEPT THOSE WITH BUSINESS THERE.

THESE, THEN, ARE OUR ESTUARIES. THESE ARE OUR COASTAL AREAS WITH THE GREAT CONFLICTS AMONG THOSE WHO WOULD USE FOR THEIR OWN PARTICULAR PURPOSES THESE GREAT RESOURCES HELD IN COMMON. WASTE DISPOSAL, RECREATION, SPORT AND COMMERCIAL FISHING, COMMERCE AND NAVIGATION--THESE ARE THE MAIN COMPETITORS FOR OUR ESTUARIES. IT IS UP TO US, THE SCIENTISTS AND ENGINEERS, TO PROVIDE TO THE DECISION-MAKERS THE FACTS THEY NEED IN ORDER TO MAKE INTELLIGENT AND RATIONAL DECISIONS ON THE PRESENT AND FUTURE USES OF OUR ESTUARIES. WITHOUT THE BASIC ENVIRONMENTAL KNOWLEDGE, THE USE OF OUR ESTUARIES WILL GO TO THE RICHEST CONTENDER, THE LOUDEST COMPLAINER, OR THE FACTION WITH THE GREATEST POLITICAL INFLUENCE. IT IS ONLY THROUGH ADEQUATE KNOWEDGE OF OUR ENTIRE ESTUARINE ECOSYSTEM, ITS PROCESSES, DYNAMICS, INTERACTIONS, AND THE RANGES THROUGH WHICH ITS MANY CHARACTERISTICS VARY, THAT WE WILL BE ABLE TO HAVE ADEQUATE KNOWLEDGE ON WHICH CAN BE BASED THE IMPORTANT DECISIONS OF THE FUTURE.

IN FLORIDA 20 YEARS AGO WE HAD 25 SEWAGE DISPOSAL PLANTS IN THE ENTIRE STATE. TODAY WE HAVE 1,800 BUT IN THE MEANTIME THE POPULATION HAS EXPANDED FROM 2 MILLION TO 6 MILLION, AND 14 CITIES IN THE STATE OF FLORIDA ARE STILL DUMPING RAW SEWAGE INTO

OUR RIVERS, BAYS AND ESTUARIES IN ADDITION TO THE MASS POLLUTION RECEIVED CONSTANTLY FROM SEPTIC TANK SOURCES.

PROVIDING THE KNOWLEDGE TO CORRECT THIS SITUATION IS A MAJOR TASK AND PROVIDING PEOPLE WITH THE WHEREWITHAL TO OBTAIN THIS KNOWLEDGE IS THE JOB PRIMARILY OF GOVERNMENT--FEDERAL, STATE, AND LOCAL. SO THE APPEAL TODAY IS PRIMARILY TO THE GOVERNMENTAL ADMINISTRATORS: IF YOU EVER HOPE TO STOP THE PRESENT TREND OF COMPLETE DESTRUCTION OF OUR GREAT ESTUARINE RESOURCES, PLAN NOW FOR THEIR OPTIMUM USE. BUT THAT PLANNING MUST BE BASED ON A COMPLETE KNOWLEDGE OF ALL THE INTERACTIONS, ALL OF THE MAGNIFICENTLY COMPLEX PROCESSES WHICH OPERATE IN OUR ESTUARIES. IT IS THE COASTAL LABORATORIES AND THE MARINE SCIENTISTS AND ENGINEERS THAT MUST PROVIDE THIS KNOWLEDGE. THESE ARE THE GROUPS THAT MUST BE SUPPORTED NOW IF OUR ESTUARIES ARE EVER TO BE ANYTHING BUT THE MISMANAGED, POLLUTED, AZOIC, UNATTRACTIVE WATERWAYS THEY ARE FAST BECOMING.

AN EXAMPLE OF THE GROUPS I AM SPEAKING OF IS THE ATLANTIC OCEANOGRAPHIC LABORATORIES OR THE NEW ESSA FACILITY IN MIAMI, FLORIDA, DIRECTED BY HARRIS B. STEWART, JR., ONE OF THE OUTSTANDING SCIENTISTS IN THIS FIELD. I AM INDEBTED TO DR. STEWART FOR A GREAT DEAL OF INFORMATION ON THIS SUBJECT AND IF I MAY QUOTE HIM: "WE ALWAYS SEEM TO WAIT UNTIL WE HAVE RUINED SOMETHING BEFORE WE GET CONCERNED ABOUT IT. THERE IS STILL SOME CHANCE FOR OUR FLORIDA ESTUARINE ENVIRONMENTS, BUT THE TIME FOR GETTING ON WITH THE JOB IS NOW--NOT WHEN THEY ARE ALL LOST BEYOND RECOVERY." THE FLORIDA COUNCIL OF 100 PLAYED AN IMPORTANT ROLE IN THE SELECTION OF MIAMI FOR THIS

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ESSA LABORATORY. I AM DEEPLY DISTRESSED TO LEARN THAT THE BUDGET FOR THIS MUCH NEEDED FACILITY HAS BEEN CUT IN WASHINGTON DUE TO THE VIETNAM WAR. WE ARE AT WAR WITH POLLUTION, AND I HOPE THE ADMINISTRATION IN WASHINGTON WILL RESTORE THE CUTS TO THE ESSA BUDGET NOW OR AS QUICKLY AS POSSIBLE.

I RESPECTFULLY SUBMIT THAT IF WE SIT HERE TODAY AND TOMORROW LISTENING TO THE EXCELLENT PRESENTATIONS THE PROGRAM LISTS, APPLAUD RESPECTFULLY--EVEN ENTHUSIASTICALLY, AND THEN RETURN TO OUR OFFICES, COMPANIES, AND LABORATORIES LEAVING THIS CHALLENGE UNMET, WE HAVE NO ONE BUT OURSELVES TO BLAME IF OUR ESTUARIES CONTINUE HEADED IN THE SAME DIRECTION THEY ARE TODAY. EACH OF US MUST BE WILLING TO CONTRIBUTE SOMETHING OF HIS TALENTS, SOMETHING OF HIS TIME, AND SOMETHING OF HIMSELF TO FURTHERING OUR EXPLORATION AND UNDERSTANDING OF THIS VERY IMPORTANT NATURAL RESOURCE.

FINAL REPORT ON THE USE OF CONCENTRATED SULFURIC ACID FOR THE CONTROL OF ELODEA

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INTRODUCTION

Located approximately 68 miles north of Tampa, Florida, on U. S. 19-98 in Citrus County, is the town of Crystal River, Florida. The Crystal River has its origin in an area known as Hunter Bay. It is a small bay located within two hundred yards of downtown Crystal River where several large boils or springs are located. The abundant and continuous supply of nitrates, bicarbonates, and phosphates from these springs makes Hunter Bay on the Crystal River an ideal situation for a vegetation problem. Commercial net fishermen, crabbers, shrimpers, oyster fishermen, charter boat operators, and fish camps have operated in this area some twenty-five to fifty years. Recently they have been joined by resort motels, real estate developers, retirement homes, and a host of new business operations dealing in merchandise and services. Dense growths of elodea species seriously reduced the tempo of the economy of Crystal River as it invaded and occupied Hunter Bay and the rest of the river.

HISTORY

It became clear that the vegetation problem in Crystal River must be solved if the economy of the area was to be maintained. Several attempts were made by chemical companies and aquatic plant control agencies to find a suitable herbicide capable of eradicating or controlling the elodea in the river and bays without success.

A local citizen, Mr. Robert Hyde, after studying the problem suggested using acid as a method of biological control. He reasoned that if the pH were lowered the plant would be destroyed.

Sulfuric acid was chosen because of its availability in the area. Large amounts are used in the phosphate industry located within ninety miles of Crystal River. The acid was purchased in fifty thousand pound lots and delivered by tank truck to the Crystal River area.

The Fisheries Restoration Team of the Florida Game and Fresh Water Fish Commission was assigned the task of determining what effect the addition of large amounts of sulfuric acid to the river would have on the fish population present in the area, also to determine how it would effect reproduction of all species of fish.

MATERIAL AND METHODS

Bottom Sampling

Mr. J. E. Burgess of the Florida State Board of Health collected bottom samples of invertebrates in both treated and untreated areas with an Ekman Dredge which measured 6 by 6 inches. The bottom sediments of each dredge sample were emptied into a container where the sediments could be examined and the bottom type recorded. The sediments were then transferred to a dip net with a one millimeter mesh bag. The fine sand and organic particles were removed by swirling the bag through the water. The remaining material was then transferred to one gallon wide mouth jars partially filled with water. Benthic organisms were subsequently sorted from the debris in a white enamel pan and placed in 95 percent alcohol.

The organisms were identified in the laboratory and placed into significant taxonomic groups with the calculated number per square meter. (See Tables 10 and 11)

Electro-fishing samples were made with a portable Milwaukee 120-240 AC Volt, 2500 Watt Generator mounted in a fourteen foot plywood boat with two portable electrodes at the bow. The boat was equipped with a bow-rail. and a foot operated dead-man switch to prevent injury to personnel that might fall overboard. Sample periods of one-half hour duration were made along the shore. The stunned fish were picked up with dip nets, placed in a live car, and returned to the water alive after length and weight measurements were made and recorded.

Rotenone spot samples were made with five percent emulsifiable rotenone. The standard procedure of pouring the chemical from the bow of a moving boat was used to distribute one quart of rotenone over approximately one acre.

A third sampling method was employed in 1965, 1966, and 1967, population studies. Two trammel nets measuring 125 yards in length were set in both untreated and treated areas. The following specifications describe the net: Three inch stretch mesh inter-net of No. 208 nylon; 12 inch stretch mesh outer-nets of No. 9 nylon hung in halves; 2.5 inch polyfoam floats on polyethelene one-fourth inch lines with the net hung five times between the floats and No. 9 leads with two ties between each lead.

All fish were measured in one inch size groups, weighed to the nearest one-tenth of a pound and recorded on field data sheets.

Application of Acid

The method used in chemical application was simple, directed toward affecting an immediate solution for the property owner and supervised by Mr. R. W. Hyde, who developed the technique. The acid was discharged directly from a semi-trailer truck into the water from a point near the problem area. A pressurized tank was employed to expedite the flow of approximately 50,000 pounds of sulfuric acid through a four inch hose.

Discharge of the chemical was timed to coincide with the interval of high tide. The greater specific gravity of the chemical affected distribution, which may have been aided to some degree by the water movement of the ebb tide.

RESULTS

Results of Acid Treatment

Sulfuric acid as a control agent for elodea has proved somewhat irregular. The principle cause for such irregularities was directly related to relying upon the high specific gravity of the chemical (1.8 sp.gr.) for distribution. Consequently, successful control depended upon the conformity of the bottom contour which would have been difficult to accurately assess because of the dense growth of vegetation. Deep holes tended to accumulate excessive quantities of the chemical causing a corresponding reduction in concentration in areas with significantly higher elevations.

The exact nature of the effects of acid on the plant as a whole is not known. All indications were that the lower portions of the plants in the higher acid concentrations were killed immediately. Much of the vegetation within the immediate area of application was significantly weakened and floated to the surface within three to seven days. The vegetation around the perimeter of the treated area gradually broke loose forming mats at the surface within ten to fourteen days.

The manner in which the vegetation beyond the area with higher concentrations was killed is not known. It is known, however, that the pH in the area of marginal treatment was not sufficiently strong to have affected a structural weakness of the stems which would cause the plants to break loose from the bottom. Since the roots were anchored in semi-consolidated materials containing considerable quantities of calcium carbonate, it appears likely that the evolution of carbon dioxide within the bottom sediments was of sufficient intensity to loosen the roots and reduce their ability to withstand the continuous drag of the currents. If this is true, the extensive mats of vegetation adrift at the surface were also an agent in removing or uprooting vegetation in the areas of marginal treatment.

The effect of sulfuric acid upon the bottom fauna was immediate and complete. No organisms were found within the bottom muds one week after treatment. However, the macroinvertebrates living on the vegetation above the mid-depth were unharmed by the acid. Vegetation mats at the surface contained a wealth of organisms, both in numbers and species diversity. Several of these forms have been found to be intolerant to acid pollution.

Fish were perhaps the least affected of any aquatic life. Adult largemouth bass (Micropterus salmoides), bluegills (Lepomis macrochirus), creek chubsucker (Erimyzon oblongus), and mullet (Mugil spp.) were observed in the treated areas both during and after treatment. The hogchocker (Trinectes maculatus), the blue crabs (Calinectes sp.) and recent hatch bluegills were the only forms observed to have experienced significant mortalities. Since the blue crabs and the hogchocker frequent the bottom, their mortality can be associated directly with the acid. In the case of the recent hatch bluegills which were not closely associated with the bottom, it appeared likely that the evolution of carbon dioxide as the acid reacted with the calcium carbonate of the bottom sediments, would be the cause for their mortality.

Results of Fish Population Sampling

The results of fish population sampling completed in 1965 and early 1966 have not been included in this paper since they were reported in earlier reports.

Trammel net, electro-fishing, and some rotenone spot samples indicated a larger fish population in locations where sulfuric acid was applied to remove elodea. This increase was composed of either bottom feeders or scavengers which may have invaded the area to feed on the remains of organisms left as a result of treatment.

Trammel netting was made difficult by large beds of elodea that interferred with the operation of the nets and may have restricted the normal movement of fishes which could have reduced the catch in untreated waters.

The mullet population became more active in the fall of 1966 and this is reflected in the results of the pre-treatment electro-fishing, trammel net, and rotenone samples.

Rotenone spot samples conducted during the observation period were considered below normal compared to work completed on other Central Florida rivers. The poor results may have been caused by certain chemicals which interferred with the normal action of rotenone, thereby reducing its effectiveness.

A second and more significant reason for the low numbers and pounds of fish taken by rotenone spot samples in Crystal River was the low turbidity of the water. Rotenone is an ineffective method of sampling where the water is clear and the fish have a number of escape routes. The rotenone spot sample taken following treatment in Hunter Bay points out this fact quite clearly. A total of 604 individuals weighing 149.6 pounds were picked up prior to treatment, and in the same area following treatment only 44 individuals weighing 5.0 pounds were collected by field personnel. The fact that young individuals of the salt water fish, (Mojarra sp.) were collected in the sample following treatment indicates that reproduction of both salt water and fresh water species was not affected by treating the area with sulfuric acid.

SUMMARY

Sulfuric acid successfully controlled the elodea in Hunter Bay, Kings Bay, and the rest of Crystal River. Elodea has reinfested in a few small areas but the rate of growth has been greatly reduced up to this time.

Sampling of bottom organisms revealed that both vallisneria and elodea samples contained more varieties and numbers of organisms than did muck bottom. The number of organisms in areas treated with sulfuric acid was larger than the number found in untreated areas. The removal of elodea, upon which many organisms had been found, caused an increase in the number and variety of invertebrates on the bottom due to the absence of their original place of attachment.

Results of fish population sampling indicated that the addition of concentrated sulfuric acid to Crystal River had very little effect on the existing fish population and no visible effect on the reproduction of either salt or fresh water species. Young of the year of all game fish were found at one time or another during the two year period covering this investigation.

CONCLUSIONS

The use of concentrated sulfuric acid as a method of elodea control in the State of Florida must meet the following requirements of the Florida Game and Fresh Water Fish Commission:

(1) The water area to be treated must have a high percentage of limestone bottom.

(2) The pH of the water must not fall below 8.0.

(3) An adequate amount of flushing action from both fresh water springs and tidal effect must be available to distribute and dilute the sulfuric acid.

(4) The public must be informed of the operation. Fishing, swimming, skin diving, and other water oriented activities must be halted until tests indicate the water to be free of sulfuric acid.

(5) All safety precautions required by the sulfuric acid industry for the handling of such material must be followed by participating personnel.

(6) Permits issued by the Chief of Fisheries, Florida Game and Fresh Water Fish Commission, are required before treating any water area within the State of Florida. All requests for permits to be investigated by Fisheries Division personnel on individual basis.

(7) All sulfuric acid treatments must be approved by the Florida State Board of Health.

ELECTRO-FISHING SAMPLING (Tables 1, 2, and 3)

Table 1. Results of electro-fishing population sampling prior to treatment.

Body of Water: Crystal River
Method: One Hour Electro-fishing
Time: P. M. County: Citrus

Date: October 31, 1966
Location: Hunter Bay
Personnel: Betz and Fish

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	3.0 - 11.0	32	4.0	19.2	4.6
Bluegill	4.0 - 6.0	14	1.1	8.4	1.3
Shellcracker	4.0 - 6.0	21	2.0	12.6	2.3
Stumpknocker	3.0 - 4.0	19	.9	11.4	1.0
Chubsucker	5.0 - 15.0	5	4.0	2.9	4.6
Golden Shiner	6.0 - 9.0	17	2.9	10.2	3.3
Florida spotted gar	17.0 - 17.0	1	.7	.6	.8
Seminole killifish	4.0 - 6.0	2	.2	1.2	.2
Pinfish	5.0 - 7.0	12	1.5	7.2	1.5
Mullet	13.0 - 18.0	38	70.8	22.8	80.0
Mojarra	4.0 - 4.0	5	.2	2.9	.2
Needlefish	15.0 - 15.0	1	.2	.6	.2
	Total	167	88.5	100.0	100.0

Table 2. Results of electro-fishing population sampling one day following treatment.

Body of Water: Crystal River
Method: One Hour Electro-fishing
Time: A. M. County: Citrus

Date: November 4, 1966
Location: Hunter Bay
Personnel: Betz and Fish

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	4.0 - 18.0	11	6.2	34.4	34.8
Shellcracker	5.0 - 5.0	1	.2	3.1	1.1
Warmouth	4.0 - 5.0	3	.2	9.4	1.1
Stumpknocker	5.0 - 5.0	2	.2	6.3	1.1
Chubsucker	8.0 - 12.0	3	1.4	9.4	7.9
Golden shiner	4.0 - 4.0	1	.1	3.1	.6
Blue spotted sunfish	1.0 - 2.0	2	Tr.	6.2	Tr.
Florida spotted gar	18.0 - 27.0	4	9.2	12.5	51.7
Seminole killifish	4.0 - 4.0	4	.1	12.5	.6
Blue crab	5.0 - 5.0	1	.2	3.1	1.1
	Total	32	17.8	100.0	100.0

Table 3. Results of electro-fishing population sampling following treatment.

Body of Water: Crystal River
Method: One Hour Electro-fishing
Time: A. M. County: Citrus

Date: January 11, 1967
Location: Hunter Bay Area
Personnel: Copeland, Cordell

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	4.0 - 19.0	22	12.4	15.6	21.0
Shellcracker	5.0 - 8.0	24	3.7	17.0	6.2
Chubsucker	5.0 - 14.0	31	28.4	22.0	48.0
Stumpknocker	4.0 - 5.0	2	.2	1.4	.3
Gizzard shad	14.0 - 14.0	1	1.2	.7	2.0
Mullet	11.0 - 20.0	10	11.1	7.0	18.7
Mojarra	3.0 - 4.0	48	1.3	34.0	2.1
Ladyfish	8.0 - 11.0	3	.8	2.1	1.3
	Total	141	59.1	100.0	100.0

ROTENONE SPOT SAMPLING (Tables 4 and 5

Table 4. Results of rotenone spot sample prior to treatment.

Body of Water: Crystal River
Method: Rotenone Spot Sample
Time: A. M. County: Citrus

Date: November 1, 1966
Location: Hunter Bay
Personnel: Cordell, Betz, Fish

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	3.0 - 15.0	81	13.9	13.4	9.3
Bluegill	3.0 - 7.0	17	1.2	2.8	.8
Shellcracker	4.0 - 8.0	389	43.6	64.4	29.1
Blue spotted sunfish	2.0 - 3.0	12	.1	1.9	.1
Dollar sunfish	3.0 - 3.0	1	.1	.2	.1
Hogchocker	2.0 - 2.0	4	.1	.6	.1
Warmouth	4.0 - 4.0	1	.1	.2	.1
Brown bullhead	8.0 - 11.0	4	1.5	.6	1.0
Chubsucker	8.0 - 13.0	10	4.5	1.7	3.0
Mullet	15.0 - 20.0	39	78.2	6.4	52.2
Mudfish	22.0 - 22.0	1	3.9	.2	2.6
Golden shiner	10.0 - 10.0	1	.4	.2	.3
Pinfish	8.0 - 8.0	1	.3	.2	.2
Mojarra	4.0 - 5.0	42	1.4	7.0	.9
Needlefish	17.0 - 17.0	1	.3	.2	.2
	Total	604	149.6	100.0	100.0

Table 5. Results of rotenone spot sample following treatment.

Body of Water: Crystal River Date: April 19, 1967
Method: Rotenone Spot Sample Location: Hunter Bay
Time: P. M. County: Citrus Personnel: Buntz, Betz, Fish, Cordell, Copeland

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Shellcracker	6.0 - 6.0	2	.3	4.5	6.0
Mullet	8.0 - 15.0	9	3.8	20.5	76.0
Mojarra	2.0 - 4.0	33	.9	75.0	18.0
	Total	44	5.0	100.0	100.0

250 YARD TRAMMEL NET SAMPLING (Tables 6 and 7)

Table 6. Results of 250 yard trammel net sampling prior to treatment.

Body of Water: Crystal River Date: November 1, 1966
Method: Trammel Net - 250 yards Location: Hunter Bay
Time: Overnight County: Citrus Personnel: Betz and Fish

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	10.0 - 19.0	4	12.2	4.0	16.2
Bluegill	5.0 - 7.0	9	.4	9.2	.5
Chubsucker	9.0 - 14.0	61	41.1	62.3	54.4
Golden Shiner	10.0 - 10.0	7	3.4	7.1	4.5
Yellow bullhead	10.0 - 14.0	9	8.0	9.2	10.6
Brown bullhead	11.0 - 11.0	1	.5	1.0	.7
Mullet	15.0 - 18.0	5	9.7	5.1	12.8
Blue crab	4.0 - 5.0	2	.3	2.1	.3
	Total	98	75.6	100.0	100.0

Table 7. Results of 250 yard trammel net sampling following treatment.

Body of Water: Crystal River Date: January 10, 1967
Method: Trammel Net - 250 yards Location: Hunter Bay
Time: Over-night County: Citrus Personnel: Copeland, Cordell

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% Comp NUMBER	% Comp. WEIGHT
Bluegill	6.0 - 7.0	2	.3	2.7	.5
Golden shiner	10.0 - 10.0	3	1.5	4.0	2.4
Chubsucker	9.0 - 15.0	48	39.4	64.0	62.2
Yellow bullhead	10.0 - 13.0	7	6.4	9.3	10.1
Brown bullhead	10.0 - 13.0	6	3.6	8.0	5.7
White catfish	11.0 - 11.0	1	.6	1.3	.9
Mullet	13.0 - 15.0	7	7.1	9.3	11.2
Tarpon	25.0 - 25.0	1	4.4	1.3	7.0
	Total	75	63.3	99.9	100.0

DAY-SET TRAMMEL NET SAMPLING (Tables 8 and 9)

Table 8. Results of Day-set trammel net sampling prior to treatment.

Body of Water: Crystal River Date: October 31, 1966
Method: Trammel Net-250 yds. Location: Hunter Bay
Time: 6 Hour Day-set Personnel: Betz and Fish
County: Citrus

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	16.0 - 16.0	1	2.0	4.5	9.6
Bluegill	7.0 - 7.0	1	.4	4.5	1.9
Shellcracker	8.0 - 8.0	1	.4	4.5	1.9
Chubsucker	9.0 - 16.0	13	11.2	59.1	53.8
Golden shiner	9.0 - 10.0	3	1.2	13.7	5.8
Mullet	16.0 - 17.0	3	5.6	13.7	27.0
	Total	22	20.8	100.0	100.0

Table 9. Results of Day-set trammel net sampling following treatment.

Body of Water: Crystal River
Method: Trammel Net - 250 yards
Time: 6 Hour Day-set
County: Citrus

Date: January 9, 1967
Location: Hunter Bay
Personnel: Copeland, Cordell

SPECIES	SIZE RANGE	NUMBER	WEIGHT	% COMP. NUMBER	% COMP. WEIGHT
Largemouth bass	17.0 - 17.0	1	2.8	4.5	12.3
Bluegill	7.0 - 7.0	1	.4	4.5	1.8
Chubsucker	10.0 - 13.0	19	18.2	86.5	79.8
Florida spotted gar	20.0 - 20.0	1	1.4	4.5	6.1
	Total	22	22.8	100.0	100.0

Table 10.

INVERTEBRATE FAUNA OF ELODEA, VALLISNERIA AND MUCK BOTTOM IN CRYSTAL RIVER, CITRUS COUNTY, FLORIDA

Organism	Vallisneria 1/	Elodea 1/	Muck Bottom 2/
Oligochaeta	435	335	0
Hirudinea	14	13	0
Palaemonetes	14	0	0
Amphipoda (scuds, side swimmers)	261	144	0
Isopoda (sow bugs)	100	0	0
Hydracarina	315	13	0
Ostracoda	13	0	0
Chironomidae	113	231	0
Ceratopogonidae	0	0	44
Trichoptera	0	13	0
Anisoptera	14	13	0
Zygoptera	57	29	0
Hemiptera	0	361	44
Castropoda	579	13	0
Ferrissia	91	0	0
	2,006	1,160	88

1/ Number of organisms per m^2 calculated from four 6 inch by 6 inch Ekman dredge samples each.
2/ Number of organisms based on three samples.

Table 11.

RESPONSE OF INVERTEBRATES TO CHANGE IN SUBSTRATE AFTER SULFURIC ACID TREATMENT AT PORT PARADISE

	Boat Basin		Boat Basin	
	Pre-treatment 8-16-65	Post-treatment 11-12-65	Pre-treatment 8-16-65	Post-treatment 12-9-65
Oligochaeta	-	87	779	-
Hirudinea	-	87	-	-
Amphipoda	-	-	-	739
Hydracarina	-	-	-	-
Ostracoda	-	-	-	43
Chironomidae	87	1044	-	267
Ephemeroptera	-	43	-	87
Trichoptera	-	43	-	-
Anisoptera	-	87	-	-
Coleoptera(Larvae)	-	43	-	-
Castropoda	-	-	-	43
	87	1434	779	1179

Table 12.

CHECK LIST OF FISHES COLLECTED IN CRYSTAL RIVER

COMMON NAME	ABUNDANCE	SCIENTIFIC NAME
Largemouth bass	F	*Micropterus salmoidies*
Bluegill	F	*Lepomis macrochirus*
Shellcracker	F	*Lepomis microlophus*
Stumpknocker	O	*Lepomis punctatus*
Chubsucker	F	*Erimyzon oblongus*
Golden shiner	F	*Notemigonus crysoleucas*
Florida gar	F	*Lepisosteus platyrhineus*
Seminole killifish	F	*Fundulus seminolis*
Pinfish	F	*Lagodon rhomboides*
Mullet	F	*Mugil* sp.
Mojarra	F	*Eucinostomus* sp.
Neddlefish	R	*Strongylura marina*
Warmouth	O	*Chaenobryttus gulosus*
Blue spotted sunfish	F	*Enneacanthus glorious*
Gizzard shad	O	*Dorosoma cepedianum*
Ladyfish	O	*Elops saurus*
Tarpon	O	*Megalops atlantica*
Dollar sunfish	F	*Lepemis marginatus*
Hogchocker	O	*Trinectes maculatus*
Brown bullhead	O	*Ictalurus nebulosus*
Mudfish	O	*Amia calva*
Yellow bullhead	R	*Ictalurus natalis*
White catfish	R	*Ictalurus catus*

F - Frequent
O - Occasional
R - Rare

Table 13.

WATER SAMPLES FROM VARIOUS CRYSTAL RIVER SPRINGS

	Crystal Lodge Spring May 12, 1966	Banana Island Spring May 12, 1966	American Legion Spring October 31, 1966
pH	8.6	8.6	8.6
Phenolphthalein Alkalinity	0.0 p.p.m.	0.0 p.p.m.	0.0 p.p.m.
Total Alkalinity	90.0 p.p.m.	90.0 p.p.m.	80.0 p.p.m.
CO_2	12.0 p.p.m.	12.0 p.p.m.	10.0 p.p.m.
Calcium Hardness	70.0 p.p.m.	110.0 p.p.m.	60.0 p.p.m.
Total Hardness	100.0 p.p.m.	270.0 p.p.m.	90.0 p.p.m.
Magnesium Hardness	30.0 p.p.m.	160.0 p.p.m.	30.0 p.p.m.
Chloride	10.0 p.p.m.	10.0 p.p.m.	17.5 p.p.m.
O_2	7.5 p.p.m.	7.5 p.p.m.	6.5 p.p.m.
Turbidity	0.00 Jackson Units	0.00 Jackson Units	0.00 Jackson Units
Total Acidity (Phenophthalein)	6.0 p.p.m.	6.0 p.p.m.	N.A.*
Free Acidity (Methyl orange)	0.0 p.p.m.	0.0 p.p.m.	N.A.*

* N.A. - Not Available

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FROM: Edward H. Gluckler, Member, Outdoor Writers Association of America, Box 117, Stuart, Florida

TO: John R. Thoman, Regional Director,
U. S. Dept. of the Interior
Federal Water Pollution Control Administration
Suite 300, 1421 Peachtree Street, N. E.,
Atlanta, Georgia 30309

SUBJECT: Statement regarding use and future development of estuarine resources, etc., topic of hearing at Orlando, Fla., March 12 and 13, 1968.

REFERENCES: For the purposes of this paper, the assumptions of the U. S. Dept. of the Interior as set forth in the pamphlet called "National Estuarine Pollution Study," issued under PL 89-753, November 3, 1966 and published July 1967 are acknowledged. In particular, reference is made to Page 5 of the report, "Frame of Reference."

1. All of South Florida, the area in which this writer has intimate and first hand knowledge, has suffered extensively in its estuarine area from so-called "development" or "progress". References beyond those cited by the Department as gathered by the Florida Department of Conservation are many and almost unanimous in their indication that man through his works of almost all types has tended to foul, not only through pollution, but also by physical destruction, the very assets by which man lives.

2. State and Federal governments have adopted legislation or are discussing almost countless topics, all designed to study the bad and admitted facts about estuarine pollution and corrective measures of the end results, such as, for example, HR 15491, "Technical Assistance to Commercial Fishing Industry".

3. Comparatively little is being done beyond very limited attempts to define pollution, a move that is planned as a forerunner (undoubtedly) to control measures, at best a police measure in an area poorly policed.

4. It appears, therefore, if many forms of marine life, including not only commercial and sports fish, but crustaceans as well as other shellfish, are even to survive in any but limited supplies, drastic measures must be taken at once.

5. The avenues are: increase pollution control measures and multiply greatly, enforcement of laws in an area of futile weakness in South Florida, possibly other areas, at this time, and;

6. Adopt a state-wide policy of dedication of bottomlands in large estuarine areas, as widely diversified as possible, in perpetuity to the public.

6-A. The State and Federal governments, through the U. S. Dept. of the Interior, and the State Board of Conservation, must recognize that estuarine areas should be evaluated both by State and Federal, possibly local government, and that areas capable of or presently supporting both specialized and widely diversified nurseries, must be preserved by their dedication to the public in perpuity.

6-B. Dredge and fill operations of all sorts must be halted in wide, but selected, areas. Recognition of the unique and tremendous value of estuaries must be emphasized; their economic value both as originators of commercial and sports fishing detailed.

6-C. Such measures as must be taken to protect these areas from the ravages of man, including protection of inlets, allocations of specific areas for channels only, the cessation of dilution practices through the flow of fresh waters, other anti-pollution measures, should be included in such projects.

7. These measures will enhance recreation through proper conservation; will probably substitute economic returns to the whole, albeit, limiting or forbidding private development which deals profits to the few, at too high a cost to the public.

8. While South Florida is referenced, there appears to be little reason for limiting such public dedications to one state.

EDWARD H. GLUCKLER

INDIAN RIVER AUDUBON SOCIETY

Brevard County, Florida

Branch of National Audubon Society

Chapter of Florida Audubon Society
1925 Indian River Road
Rockledge, Florida 32955
March 13, 1968

Mr. John R. Thoman
Regional Director
Federal Water Pollution Control Administration
Suite 300
1421 Peachtree Street
Atlanta, Georgia

Dear Mr. Thoman:

Your hearings have greatly encouraged me in the hope that at long last there will be a widespread effort to clean up our waters and stop reckless destruction of our estuaries. Since I have struggled against the wide-spawning dredge-fill operations in Brevard County for several years, I am happy to have strong allies in addition to the always helpful United States Bureau of Sports Fisheries and Wildlife.

I withdrew from presenting the enclosed paper because time was flying yesterday and I had to return to Cocoa for an organizational meeting to set up a county-wide bulkhead committee. You or one of your readers can skim the paper in a minute whereas it would have taken seven minutes to read it aloud to you gentlemen who must have been weary long before I was scheduled to take the microphone. With the battery of brain-power that gave testimony, mine adds little but support for research and planning based on research findings.

We hope further destruction of our estuaries will be halted until research has been completed. Perhaps you know my good friend Dr. Richard Pough, an engineer (MIT) and one of our most distinguished conservationists. He has long believed that only if an all-over plan for the future is set up which will provide for industrial growth and change, and a survey of our natural resources can we continue to be strong. Such a survey could determine which areas are expendable for industrial growth, and which must be saved at all cost. Many of us would be forced to surrender some of our pet areas but at least there would be a sound basis for providing for our future.

Sincerely yours,

Helen G. Cruickshank/Signed

Mrs. Allan D. Cruickshank
Conservation Chairman

Mrs. Allan D. Cruickshank
1925 Indiana River Road
Rockledge, Florida 32955

NATIONAL ESTUARINE POLLUTION STUDY, U.S. DEPARTMENT OF THE INTERIOR

Orlando, March 12, 1968

MR. THOMAN: I represent the Indian River Audubon Society of Brevard County. It is our purpose to awaken the public to the need for, and to encourage the prudent care and wise use, of our natural resources including all wild animals, plants, water and soil in relation to human progress.

We thank you for giving us time to present our views on water pollution chiefly as it affects us locally, though be assured we support your efforts to clean up our waters throughout this nation.

For many years while we worked to restrain the dredgers and fillers who, in spite of our efforts, have filled in 1,022 acres of Brevard's estuaries in the past ten years, we have been accused of being against "progress" and of being "for fish and against people". It gives us great pleasure to know we have the strong support of the United States Department of the Interior not only in the protection of our estuaries, one of our most vital and complex natural resources, but also in the quality of the waters we strive to protect from unwise treatment by men.

I am sure no individual or corporation wants deliberately to deprive us of our right to clean, good water by destroying an area that is the key to the annual production of millions of dollars worth of seafood that, protected, will continue to yield a high income if our estuarine capital is correctly handled. These same waters can all too easily be spoiled for healthful recreation and those dependent on this resource for their livelihood can easily be deprived of it.

As our population mouths toward 300 million, we are becoming acutely conscious of the increasing necessity to approach all changes and increases in water useage cautiously, and evaluate all proposals in terms of their impact on natural resources and the welfare of every citizen. The fact that within 20 or 30 years our daily water requirements will reach 1,000 BILLION gallons per day while our average supply of rain and snow amounts to only 650 billion gallons daily should cause the most thoughtless person to heed the danger of steadily rising pollution.

Sources of water pollution in Brevard County are similar to those across the continent. We are fortunate to have at this time a relatively low amount of industrial pollution, and hope to prevent it in the future. Pollution by many kinds of littering the waters, by raw and insufficiently-processed sewage, and by seepage from septic tanks has reached a dangerous level. A high degree of pollution results from excessive dredge and fill operations which still spawn abundantly in spite of the Randall Act for which we had great hopes. Weekly surveys of our estuaries always reveals new projects which are permanently damaging our estuaries. Silting brings all manner of pollutants ranging from smothering soil to deadly chemicals, bacteria and viruses including a high count of bacillus coli, an indication of sick waters that make the Indian and Banana Rivers hazardous for such recreation purposes as swimming and water skiing, and render shellfish unsafe for human consumption for much of the year. All contribute to the debasement of our estuaries.

Personally my husband and I found life in our home devalued when water from a drainage project was illegally discharged into the Indian River by a ditch beside our land. This polluted our well, affected our septic tank (we live in a country section), and quickly built a sandbar off our shore. This in turn encouraged a rank growth of algae and a loss of oxygen that resulted in a terrible stench and gases that blackened the paint of our house indoors and out and also tarnished all our silver. It cost us $800 in legal fees before the illegal water was diverted but the damage done in about ten months continues and probably will for years to come. Yet the flow of water that created this damage was quite small. We believe that settling areas should be mandatory whenever inland water is discharged into our estuaries.

There is no need to repeat the reasons why clean water in abundance is essential to our economy, our health, and even our national security. We wish, however, to mention something about the cost of failure to clean up our waters and then keep them clean. The cost of abatement is greater each day we permit the problem to remain. We are grateful to all those individuals, groups and government officials who now face up to the problem which until now has been too little too late. As has been stated ironically, we are all conservationists until our personal commercial interests are affected.

The distinguished British ornithologist, James Fisher, has aptly termed homo sapiens the dirtiest animal on the face of this earth. As our population skyrockets, the debris of our lives climbs ever higher and grows more dangerous to our future.

It is going to cost fantastic sums to clean up the mess we have made both of the land and of our waters. But failure to do so will be far more costly and lead to disaster. We must face the cost of pollution, for this is far greater than the cost of cleaning it up.

It costs in increased outlays for making water simply fit to drink.

It costs us lost opportunities in many instances, for industrial and commercial expansion, because clean water is not available. Let me urge you to take note of the water-recreation opportunities held forth by advertisers of industrial acreage in Florida, and by employers seeking employees to move to Florida.

It costs a loss of food fisheries and sport fisheries and in the many jobs and business turnover that goes with the fisheries industries. One of our leading fish-and-tackle shops in Cocoa was recently abondoned for what was once called the Sea Trout Capital of the World has been virtually deserted by that fish.

It costs us in the loss of vital habitat for many kinds of wildlife, and even in direct kill of waterfowl. A few years ago Brevard County boasted, on the basis of studies by the United States Fish and Wildlife Service, 75% of the duck days of all Florida, but that bright picture is fading as our waterways are being killed.

Pollution costs us loss of residential quality and depressed real estate values. I have already mentioned the stench and paint-destruction caused by abnormal algae growth in the Indian River. The Banana River is affected as seriously. It also costs us in the corrosion and other damage to boats, docks, and many facilities.

Water pollution can only be called a sickness. Unless it is cured, it may kill us, as it is killing our estuaries.

We supported the Clean Water Restoration Act of 1966 and are delighted that action is underway to implement that important legislation. We urge the proposed expansion of research for the program of pollution eradication be speeded up all along the line. We favor the elevation of the program in the administration structure either through establishing a separate agency or by providing for its equivalent with the Public Health Service.

We believe the effort to clean up our waters and prevent further decrease in their quality because of pollution or by shrinking of their dimensions by dredging and filling demands strong enforcement. Florida, I regret to say, is among the 16 states that lag behind Federal standards for water quality planning. While we favor local and state control wherever possible, waters cross county and state lines. Therefore the Federal Government must be given, in this instance, strong enforcement powers, and also contribute largely to needed research and all-over planning.

We believe that high standards of sewage treatment must be enforced. Industry must be held legally responsible for handling its wastes and accept the entire cost of errors and accidents. If the heavily industrialized Ruhr River could be cured of pollution, so too can our waters.

Before damage is done, we believe legal measures should be set up to control the discharge of heated water from nuclear power plants. Thermal pollution from conventional power plants already injure the waters of Brevard County. We believe science and engineers, working together, can devise some kind of closed-circuit cooling systems to prevent thermal pollution which is presently regarded as a threat to the health of our waters.

We hope that now enough people are aware of the terrible danger facing us to support the legislation and the appropriation of funds needed to clean up our waters and maintain their purity. With every new soul born into this country, and with every passing day the problem increases in size and becomes more acute.

Time is short, the cost will be tremendous, and the urgency is stunning. Nevertheless we believe that Americans will face the facts and accept the challenge.

We thank you again for the privilege of expressing our views and for your courtesy in listening to us.

STATEMENT BEFORE FPCA HEARING IN ORLANDO, 3/12/68

The Florida Water & Pollution Control Operators Association sends you greetings.

In order to acquaint you with some of the facts concerning our Association, I wish to make the following introduction of our organization to you speaking as the President:

The Operators Association consists of a membership of 1500 people engaged in the operation and management of the water treatment and pollution control facilities in Florida. Our Association objectives are set up in Article I of our Bylaws which are here partially stated:

Paragraph 3 "The objects shall be to arrange for educational and training programs for water and pollution control operators.

Paragraph 5 To create a better understanding of pollution control.

Paragraph 7 To help preserve the rich natural resources and beauties of Florida, yet keep in step with our natural growth.

Paragraph 8 Mainly to protect the health of the citizens of Florida."

During the 27 years that this Association has been in existence, many studies have been made and many papers have been presented by members on the subject of estuarine pollution and the abatement of such pollution. We have become cognizant of the many problems involved in the study of estuarine waters and have become aware of the great damage that has been done in some areas of our State by the uncontrolled discharge of pollutants into these waters. We are aware of the half-hearted attempts at abatement, as well as the successful systems that are doing a good job of pollution removal. We are also aware of the fact that there are large sections of our coast line in which the old adage "The solution to pollution is dilution" holds firm, and as a result our estuarine waters in these areas are grossly neglected. As a result, the life cycle of the marine life is seriously interrupted, the fishing is poor, the seafood industry is suffering, and the recreational and esthetic atmosphere has been ruined. Since we seem to be so aware of these facts, the natural question should arise of why we haven't done anything about these things.

To be able to do anything about the problem requires the solutions to many problems, the development of a philosophy of how far do we go, and how do we get there. These things are beyond accomplishment by our organization.

Pollution means many things, among which are human wastes, animal wastes, insecticides, fertilizers, chemicals and many other items, even including waste heat. To remove these pollutants will require the cooperation of every individual, every industry, and every political entity, as well as the expenditure of millions of dollars. Old treatment processes and plants will have to be made more efficient; new processes and new treatment plants will have to be devised and built. Other plants will have to be renovated and/or enlarged to carry additional loads successfully.

All of this effort and expenditure can be devoted to pollution abatement and still would not succeed because of one item that many who are planning and dreaming do not seem to recognize. The one item is the work force upon which the ultimate burden of success will fall. I do not mean the designers, engineers, or managers, but the treatment plant operators.

Today the pollution control operator, waste water treatment plant operator, or sewage plant operator--call him what you may--is in woefully short supply. Those we have are, mainly, well trained, conscientious, willing, and dedicated. However, they are getting older and will soon die out. Why? Young people are not interested and could care less for several reasons, such as lack of glamour, lack of desire, poor recruitment procedures, the desire to be chiefs instead of Indians, and last but not least, the poor pay. Very few young people wish to be known as a sewage plant operator--the job has a certain stigma about it. Many who would possibly become operators don't even know the field is wide open. Many are after the "fast buck", and few care to do the studying necessary to learn of the facets of a technology that is becoming more complicated as new and more efficient processes are developed.

All is not black and dreary, however. Many of the factors required to remedy the recruitment problem already are either being developed or are on the way. Legislation for licensing and compulsory certification almost passed during the last session of the Legislature. Courses are being offered by the Vocational Education System, and it is hoped that a two year technical course will be offered by the Junior College System soon. These programs are being fostered by the Operators Association, but help is needed, both financial and moral. We can do little about the pay situation, but we believe that improvement in the quality of the operator will result in improved salaries. Remember, all the research, planning, financing and building could be useless without competent well trained operators who can be developed with your help.

CITRUS COUNTY AQUATIC WEED COMMITTEE REPORT

October 19, 1967

1. Problem

A. Citrus County's rivers and lakes are its greatest natural resource. If the rivers and lakes remain clogged with weeds and hyacinths the result will be a serious setback to the economy of the entire county. Tourists will not visit the county for recreational purposes. Potential residents who would enjoy the recreational aspects that our waterways have offered will not care to reside here. See Annex A.

2. Discussion

A. The problem divides itself into two parts, the above water hyacinth/lettuce problem and the below water elodea/milfoil problem. Each has its separate solution, but the complete picture effects the whole county.

B. The hyacinth/lettuce problem can be effectively controlled. The solution is primarily the availability of equipment and chemicals for treatment. Equally important is intelligent supervision of personnel working with the problem.

C. Unlike the hyacinth/lettuce problem there is no undisputed specific solution to the elodea/milfoil problem. All efforts to date have resulted in spotty and short term improvements. Cutting has resulted in spreading these weeds. A permanent solution must be found.

D. There is no question but that sewage supplies a nutrient for these pests. An undetermined number of cesspools and direct sewage outlets presently drain into the Crystal and Homosassa Rivers.

3. Recommendations

A. That a separate county agency with a qualified supervisor be created immediately for the purpose of control and/or elimination of the hyacinths/lettuce, elodea/milfoil, or other troublesome aquatic growth plaguing the lakes and rivers of Citrus County. The incumbent of this position should have qualifications acceptable to the state agencies concerned.

B. That the County Commissioners promote the creation of sewage and water districts throughout the county with adequate provisions for sewage disposal.

C. Hyacinths/lettuce

  (1) That citizens, as an emergency, be furnished materials to eliminate hyacinths/lettuce under supervision of the proper authority in the public waters of Citrus County.

D. Elodea/milfoil

  (1) That all cutting in the waters of Citrus County of elodea/milfoil be immediately stopped.

  (2) That State and Federal research projects be requested for control/elimination of the weeds.

  (3) That chemical companies be solicited to study this weed problem and make recommendations for its control.

  (4) Investigate the effect of large quantities of saltwater on these weeds and if found effective, study the feasibility of bringing saltwater into Crystal River via canal with locks.

  (5) That sulfuric acid be immediately utilized as an emergency method of controlling these weeds. That sulfuric acid be applied under careful supervision of proper authorities utilizing methods of distribution that provide for maximum effectiveness.

Annex A: FINAL REPORT ON THE USE OF CONCENTRATED SULFURIC ACID FOR THE CONTROL OF ELODEA by C. L. Phillippy.

T. F. Bonsall
Col. T. F. Bonsall

Francis Oden
Francis Oden

Norvell C. Bryant
Norvell C. Bryant

Robert Stricklin
Robert Stricklin

William M. Lyons
William M. Lyons, Chairman

UNIVERSITY OF MARYLAND

NATURAL RESOURCES INSTITUTE

STATEMENT OF MR. A. J. MC ERLEAN, POLLUTION ECOLOGIST, DEPARTMENT OF ENVIRONMENTAL RESEARCH, NATURAL RESOURCES INSTITUTE, UNIVERSITY OF MARYLAND, PRESENTED TO THE NATIONAL ESTUARINE POLLUTION STUDY MEETING HELD AT ORLANDO, FLORIDA, 12 MARCH 68.[1]

Dr. L. Eugene Cronin, Director
University of Maryland
Natural Resources Institute
Chesapeake Biological Laboratory
Solomons, Maryland

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[1] Natural Resources Institute Reference Number 68-12.

It is a pleasure to be able to address this group concerning our studies of the effects of thermal releases on estuarine ecology. Dr. J. A. Mihursky, Chairman of the Department of Environmental Research, was unable to make this presentation and I have been asked to substitute.

Our group has studied the effects of thermal pollution in the Patuxent since 1962. Many people have contributed to this effort, however, time does not permit complete citation. Support of this research has come from Maryland's Department of Water Resources; the University of Maryland Water Resources Research Center (United States Department of the Interior); Department of Chesapeake Bay Affairs; Bureau of Commercial Fisheries; and the University's Natural Resources Institute.

Ace note – insert (

Background

Many publications have been concerned entirely or partly with the effects of temperature upon aquatic organisms under laboratory and field conditions. Temperature is now known to be a very important lethal, directive, and controlling factor in the aquatic habitat. It is lethal in that certain high or low levels can directly cause mortalities, directive in that it influences daily and seasonal behavior, and controlling in that it affects biochemical reaction rates and consequently influences metabolic rates. It is indeed a "master factor".

insert ②

Maryland, like many of the Southeastern states derives much pleasure and profit from her water resources. Therefore, the necessity of assessing the effects of thermal pollution is obvious. Thermal pollution is a by-product produced from power generation. Until recently however, individual installations were small in size and influenced a relatively small segment of any receiving body of water. In the past decade however, it has become quite clear we are in a developing electric age.

Electricity requirements are continually being revised upward. We have seen estimates ranging from 32 to 256 times increase by the year 2010 from a 1960 base year. Pertinent to our concern for the aquatic environment is the large volumes of cooling water required by the new and larger power plants, especially nuclear plants. Such units may require over 3 billion gallons of water per day.

As a result of the above considerations and also as a result of the need for specific information pertinent to a proposed change in Maryland's environment, we initiated a large scale multidisciplinary research program on the Patuxent River Estuary in 1962. (next slide with not there to myself) The study centers around a 710 megawatt coalfired Steam Electric Station (S.E.S.) that uses up to 750 million gallons of water per day, and, depending on pumping rates, heats the water 11.5 to 23°F above ambient temperatures.

The field program investigates physical, chemical and biological aspects carried out by over a dozen cooperating state, federal, and university departments or agencies. Our laboratory program began in January, 1966.

It is not possible to discuss all our research programs or their results in this brief discussion. Perhaps, in deference to brevity, it would be better to read some 13 selected titles of a possible 24 reports and publications that have resulted from the program. As many of these items as seem pertinent can be made available to your group:

1. Mihursky, J. A. 1963. Patuxent River Estuary Study with Special Reference to the Effects of Heated Steam Electric Station Condenser Water on Estuarine Ecology.
2. Mihursky, J. A., C. I. Gibson, V. Kennedy and W. Roosenburg 1966. Progress Report to 1 July 1966. Patuxent Thermal Study.
3. Mihursky, J. A., A. J. McErlean, W. Roosenburg, V. S. Kennedy and C. I. Gibson 1967. Progress Report Period 1 July 1966 - 31 December 1966. Patuxent Thermal Studies.

4. Mihursky, J. A. and V. S. Kennedy 1967. Water Temperature Criteria to Protect Aquatic Life.

5. Kennedy, V. S., J. A. Mihursky 1967. Bibliography on the Effects of Temperature in the Aquatic Environment.

6. Mihursky, J. A. 1967. Interim Recommended Regulations for Steam Electric Stations in Maryland.

7. Mihursky, J. A. and L. E. Cronin 1967. Statement concerning the Temperature Recommendations in the State of Maryland's Department of Water Resources draft entitled "Water Quality Criteria and Standards."

8. Mihursky, J. A., A. J. McErlean, W. H. Roosenburg, V. S. Kennedy 1967. Progress Report Period January 1 - July 1, 1967 - Patuxent Thermal Studies.

9. Mihursky, J. A. and L. E. Cronin 1967. Progress and Problems in Thermal Pollution in Maryland.

10. Mihursky, J. A. 1968. Statement on Environmental Research to the Senate Subcommittee on Air and Water Pollution, Feb. 6, 1968.

11. Mihursky, J. A. 1967. (On Possible Constructive Uses of Thermal Additions to Estuaries.

12. McErlean, A. J. and J. A. Mihursky 1968. Graphical and Mathmatical Analysis of Species Diversity and Abundance.

13. Resolution of the Maryland Board of Natural Resources concerning Public Utility Operations in Maryland, 1968.) the end

~~In the remaining time I would like to thumbnail some effects noted in the Patuxent Studies.~~

See insert pa

Due to the location of the intake and outfall structures and the nature of an estuarine system, the heated water may at times sink below the water surface in the receiving area. Subsurface heated water distributions may effect benthic populations. Inversions of this type undoubtedly retard cooling which depends on surface distribution for maximum heat exchange with the atmosphere.

Water pumped through the power plant contains many entrained organisms that may be subjected to thermal shock, physical damage, as well as certain chemical additives. The types of entrained organisms are various; phytoplankton, zooplankton, shell and finfish larvae are examples.

Studies on phytoplankton and zooplankton have shown destruction of up to 95 percent upon passage through the (S.E.S.). In addition to thermal shock problems, use of chlorine as a biocide to clean condenser tubes may seriously harm entrained organisms. If recovery rates of entrained species cannot keep up with the destruction rates, extensive depletion of these species can be expected in the open environment.

In addition to effects on entrained organisms, we must also consider organisms in the open environment. Here plants and animals are subjected to the heated discharge water and are influenced by its distribution in the estuary. After initiation of power plant activity, we observed a considerable increase in green oysters in the river. It is suspected that the greening, which is due to copper uptake, resulted from condenser tube corrosion problems of the plant. The increase in greening began at stations nearest the outfall and spread with time to downstream stations.

Fish studies indicate a congregation of fish in the heated water area during cold seasons and an avoidance of the heated area during warm seasons. Field observations of commercial and recreational fishing support the previous statement.

Large kills of fish and other animals are pertinent to future management or regulatory decisions. Such kills have been reported around intake and outfall structures of power plants. The largest observed in the Patuxent was in 1966 when an estimated 40,000 dead blue crabs were found in and around the S.E.S. discharge canal area.

Laboratory studies have demonstrated that many estuarine animals found in the Chesapeake region are not able to survive temperature increases much above those maxima that naturally occur in surface waters during hot summer periods.

Some apparently beneficial results have occurred. The sea nettle, considered a pest by swimmers during warm weather, has shown reduced numbers in the estuary near the plant. Another apparently beneficial result has been the creation of a cold weather fishery for white perch and other species near the effluent.

In the remaining time we would like to offer some recommendations concerning our results. These relate to the Chesapeake area but may have application in other contexts.

Needed Research and Controls

1. Considerably more basic research is needed on the effects of temperature and temperature change on all life history stages of our important aquatic species. Temperature effects on mortality, behavior and physiological activity are not presently available in sufficient quantity or quality to make definitive predictive statements about S.E.S. effects at all proposed sites.

2. Alternative methods of cooling should be explored and evaluated.

3. Temperature effects must be related to and cross referenced to other forms of pollution such as organic loading and industrial wastes.

4. Chlorine, used to clean condenser tubes of S.E.S., acts as a biocide, and its use should be prevented. Other less harmful cleaning methods, such as the "ping pong" ball technique should be required.

5. Since certain commercially important shell fish can concentrate heavy metals in their body tissues and be rendered unfit for human consumption, adequate safeguards should be required to prevent metallurgical problems and the consequent release of heavy metals to aquatic systems.

6. If large volumes of cooling water are to be used, site selection is a critical operation and should consider environmental cost-benefits as well as engineering ones.

7. The power utilities should not be permitted to operate independently in site selection and permits for land aquisition, construction and water use should not be given until a responsible state or federal agency has approved the site and operational procedures as optimal to the public welfare.

8. Power utilities should bear the cost of investigational work necessary for site and environmental evaluations.

9. Ecological evaluations must be carried out by responsible individuals or agencies approved by the controlling state or federal agency.

10. S.E.S. regional development should balance with large scale regional socio-economic planning and not conflict with it.

11. Possible constructive uses of waste heat should be throughly explored, with a pilot plant operation as a first step.

Conclusions

We are attempting to continue our research on thermal effects and have a number of research proposals pending with the State of Maryland and the Office of Water Resources Research. Proposed research involves a continuation of our laboratory studies; a follow-up study on the effects of thermal loading on primary production of the estuary; and the possibility of undertaking field studies at a proposed coalfired plant on the Potomac River and a nuclear plant on the Bay.

We recognize that our present society cannot maintain itself without an electricity supply, but we also recognize that a quality society needs a quality environment. With proper consideration by industry, regulatory, management and research agencies, there is no reason to expect less from our technological ability.

As a result of some of the above considerations, Maryland's Department of Water Resources altered its temperature regulations and established relatively stringent new standards in 1967. Other states are now also establishing temperature standards, some for the first time.

We will hold an international workshop thermal pollution at our Chesapeake Biological Laboratory in September of this year.

STEWART L. AYERS
ATTORNEY AT LAW
POST OFFICE BOX 1055
CRYSTAL RIVER, FLORIDA 32629
795-3768

February 19, 1968

Director
Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Re: National Estuarine Pollution Study
March 12 - 13, 1968, Park Plaza Hotel,
Orlando, Florida

Dear Sir:

I have received a letter dated February 14, 1968, as the Mayor of the City of Crystal River, Crystal River, Florida, an invitation to appear at the captioned Pollution Study in Orlando on March 12th, by invitation of Mr. John R. Thoman, Regional Director.

The War on Weeds Society, Inc., a Florida non-profit corporation, will represent the City of Crystal River, County of Citrus, State of Florida, at the above captioned meeting. It is anticipated that visual aides will be used and the President of the corporation and his assistants will bring their own slide projector and slides.

A written statement will be mailed to Athens, Georgia, prior to the meeting. Please include the aforementioned representative of the City of Crystal River on your agenda for March 12th. A copy of this letter is being mailed to Mr. John R. Thoman, at 1421 Peachtree Street, NE, Atlanta, Georgia, 30309.

Very truly yours,

Stewart L. Ayers
Mayor, Crystal River, Florida

SLA:jb

cc: Mr. John R. Thoman

WORLD FAMOUS FISHING WATERS

GREATER
PINE ISLAND CHAMBER OF COMMERCE

P. O. BOX 525, MATLACHA STATION, FORT MYERS, FLORIDA 33901

March 10, 1968

John R. Thoman
Regional Director
U.S. Dept. of the Interior
Fed. Water Pollution Control Administration

Dear Mr. Thoman:

Our Chamber of Commerce is vitally interested in all facets of Conservation. We realize that pollution of our waters could become a great problem and wish to learn all we can to circumvent these problems as they may arise in our area.

We feel that the greatest danger to our estuarine resources lies in the indiscriminate dredging and filling of our submerged lands. Dredging destroys our bay-bottoms which are invaluable to marine life and filling once accomplished can not be undone no matter how much we wish it so. We therefore ask you to give long range consideration to this great threat to the very things Florida stands for- her tourists, so many of whom come for the excellent sports fishing and our commercial fishing industries which contribute greatly to Florida's economy.

Sincerely,
Mary Barnes Chairman Conservation Committee
Mary Barnes

A GOOD PLACE TO FISH . . . VISIT . . . LIVE!

C. Richard Robins
6840 SW 76th Terrace
South Miami, Fla. 33143

April 10, 1968

Mr. John R. Thoman
Regional Director
U. S. Dept. of the Interior
Federal Water Pollution Control
Administration
Suite 300
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Conservation has a general theme not only the preservation but the wise utilization of our natural resources. There are few resources that are so important or that serve so many interests in southern Florida at Biscayne Bay. Remembering that Florida's hospitable climate is a prime force in bringing to Florida not only private citizens but members of our industrial community, and remembering that so much of our outdoor recreation is directed to the sea shore, the attention now being given Biscayne Bay and its future is well earned and very belated. Biscayne Bay serves many interests. Among the recreational users are the swimmers and bathers, the water skiers, the skin divers, the pleasure boaters (both motor and sail), and the fishermen (both from boats and from bridges and sea-walls). This group of users is not of one mind and their interests frequently conflict. In addition, Biscayne Bay supports commercial fisheries within its own waters and contributes young animals to other fisheries outside her borders. Biscayne Bay provides an avenue of navigation, an important waterway; it is a vehicle for waste disposal; it may serve in the future as a base for parts of an expressway system; its waters are in demand for industrial purposes.

The problem of thermal pollution now under discussion is only part of the broader picture requiring multilateral planning. Proper evaluation depends on the build-up of a base of real knowledge about the waters and life in the bay, knowledge that today is sketchy at best in most areas.

Florida has a rich fish fauna, in excess of 1300 species. This richness reflects the mixing of tropical and cool water faunas, of island and continental faunas, of coral reef and bay and back water communities. About 650 species occur in shallow waters of southeastern Florida and about one-third of them may occur regularly in Biscayne Bay and along her seaward keys. There is some seasonal change in the numbers of species present but most are of year round occurrence. Very severe winters such as that about 1957 have caused kills of some species, particularly the more tropical ones and at such times cool water fishes move in and become common for a year or two. The critical time for all is the summer when water temperatures approach the upper limits of tolerance. Observations that I made in some hot embayments near Bahia Honda in the summer showed that no fishes were present in that area in waters warmer than 100°F and that only 2, a blenny (the molly miller) and a demoiselle (the sergeant-major) were present in water of 97°F. In contrast nearby water of 92°F supported a typical tropical shore fauna. Except for such tolerant shore-line fishes as the killifishes and certain gobies we may expect most of the bay's fishes to disappear at water temperatures somewhere between the two mentioned above. Work done in Everglades National Park and Florida Bay again suggests that about 95°F is a critical point for the tropical fauna. Generally as one ecological factor approaches a tolerance limit we may expect reduced tolerance to other factors such as low oxygen values, turbidity, and pollutants. Other additives to the Bay at such times could have severe effects. In temperate regions a warm effluent may eliminate temperate fishes and allow colonization by warmer water species. Nothing can replace tropical species when temperatures are too warm for them.

Therefore, the problem of thermal addition varies not only with the region in question but with the season. In south Florida thermal addition is most critical during the hot summer months. Possible increase in blooms of micro-organisms (if such occur) and consequent reduction in light penetration are other problems to be studied.

Thermal addition to Biscayne Bay raises many serious questions. It would be nice to say that it will be disastrous or that it will have little effect. Unfortunately the answers are not easily determined, nor is the necessary information now at hand.

Sincerely,

C Richard Robins

C. Richard Robins

6840 SW 76th Terrace
South Miami, Florida 33143

CRR:emk
cc: N. Reed
Sen. Muskie

March 12, 1968

TO: Eugene T. Jensen, Chief
Office of Estuarine Studies
Division of Technical Services, FWPCA
U. S. Department of Interior

FROM: John F. Nielsen, Jr. Mayor
City of Madeira Beach, Florida

SUBJECT: National Estuarine Pollution Study
Statement - Public Hearing - March 12, 1968

To begin with - the following remarks may not be profound or original, however, any constructive contribution to the national problem of pollution regardless, is part of the sum total in a sincere effort to help solve this critical situation.

The use of the word "pollution" in this statement is meant to mean and be identified with Estuarine pollution and the study in progress.

Pollution is the unpleasant by-product of progress. It is found in almost any metropolitan or highly urbanized or industrial area. Its source varies in quantity and nature from area to area. It can be from industrial wastes, by-products of manufacturing, wastes not completely treated in sanitary sewer systems, excessive dredging and filling and many other sources. Essentially these are the general and most prevalent contributors to pollution and applies to our area in Madeira Beach, Pinellas County, Florida.

Madeira Beach and Pinellas County, Florida, are geographically located on the West coast of Florida, approximately half way down the state and is a peninsular. It is surrounded on three sides of its outer perimeter by the Gulf of Mexico, Tampa Bay and Boca Ciega Bay. Because of its proximity to these bodies of water it is basically a tourist and recreation area, heavily depending on water resources and the benefits of sport fishing, bathing beaches, swimming, breeding grounds for commercial fishery, water skiing, et,al. to support its tourist and retirement economy.

Locally within the County and on the state level, efforts are now being made to solve pollution problems. However, those agencies and governmental bodies are limited in their scope of authority and jurisdiction. We must realize the antipollution measures and remedies are expensive and the cost factor must be considered as well as applied to the various problems within the pollution field. For these reasons I would submit the following as possible steps and procedures to the overall problem of pollution.

1. That the task of control and legislation be allocated to the governmental body best equipped to deal with the problem, funded properly to insure perpetual and successful results.
2. Divide the problem areas into three divisions.
    a) Regional
    b) General
    c) Specific

Under these three divisions should be listed the common problems and unusual conditions. These problems and conditions should be rated by priority determined by their importance and nature.

Co-ordinantion by County, State and Federal agencies in this field should be of upmost importance in order to avoid duplication of effort.

Because of the magnitude of the problem of pollution and the tremendous cost it would be impossible to solve or control in a relatively short period of time. Therefore I suggest the following approach. That effective measures be implemented in three stages.

1. Immediate recommendations and solutions to the problem. This should be fostered by extensive and effective legislation in regard to pollution and pollution control.
2. Intermediate recommendations and solutions. Goals to be worked toward in the near future.
3. Long range analysis and evaluation of the problems projecting into the future.

As to specific recommendation under Item 1 above, "Immediate Recommendations and Possible Solutions", I would like to focus your attention on the secondary sanitary sewer system experiment that has been conducted since July, 1967 in the City of Madeira Beach. This undertaking has been by private interests using the municipal primary plant and effluent for said experiments. The nature of these experiments is a concept that has been worked on for some years. However, to this date some measures of success has been obtaned in purifying the sewer effluent through this method. The method is known as the "Gehring Ionic-Dialysis Method of Treating Water and Waste Disposal Process".

As to background it should be mentioned that Madeira Beach treats raw sewage for three other communities in addition to its own. Our collection system is some 15 years old with problems due to the nature of tidal flow and water table that are not found in the land established systems. It is gravity flow from its furtherest point for some considerable distance which causes the effluent to have properties that make it difficult for treatment.

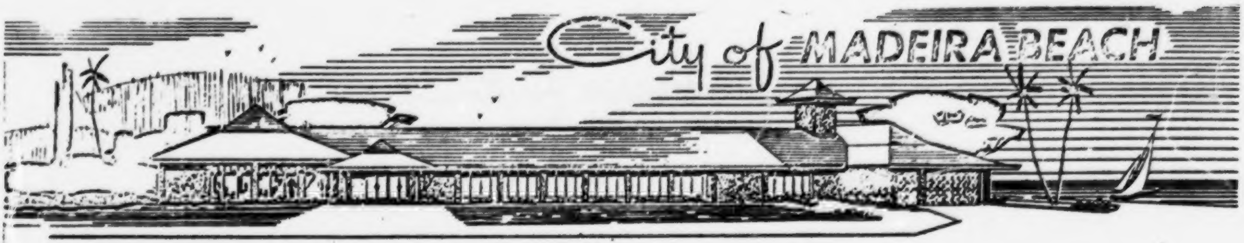
The physical plant installation of the primary system is of conventional type, wetwell, sediment tank, vacumn filter, chlorination chamber and discharge. Under these experiments the effluent is extracted with suspended and dissolved solids that is run through a series of chambers and electrically treated, drawing off in the process the constitutes of the original effluent separating these and resulting in a sludge which is odor free and the liquid some 97% pure or better. A trace of chlorine is about all that one finds in the end liquid product.

This statement not being of technical nature or professional point of view but rather from an observer and interested official, I would suggest that the results of these experiments which will be available in the very near future be evaluated and regarded as a possible breaktrhough in secondary sanitary sewer system applications and possible other uses.

To date, this process has worked, however, the cost per million and other technical data has not yet been compiled. As of this writing the instrumentation and evaluation of this process is being compiled by Fischer Porter Company and Newton P. Gehring, the inventor and engineer, at our municipal plant in Madeira Beach.

Being optimistic I hope in some small way this statement contributes to the study on estuary pollution in the resulting solutions.

Respectfully submitted,



City Manager Stephen A. Derry, P. E.

COMMISSION - MANAGER GOVERNMENT

October 19, 1967

Mayor and Members of the City Commission
City of Madeira Beach, Florida

Gentlemen:

For years, the Madeira Beach number one problem, from the standpoint of efficient operation and expense, has been our sewage disposal plant. Health Department tests for several years have indicated that our plant leaves a great deal to be desired. The City was advised some time ago that secondary treatment would have to be added or other facilities provided to meet necessary health requirements.

Over the past six months a new, practical and exciting invention relative to the treatment of sewage has come to light in our Madeira Beach. The following is a brief resume of this happening:

1. On or about April 1st 1967 the plant superintendent informed the City Manager that a fellow had been getting raw sewage samples from the plant for experimental purposes for 4 years. Six weeks of conversation convinced the City Manager that Newton Gehring's ionic-dialysis method of sewage treatment had merit worthy of further investigation.

2. Memo #70, dated June 29th 1967, directed to the City Commission from the City Manager informed the Commission of a possible solution to this number one major problem. Interest was generated by a majority of the Commission. Permission was granted to set-up an experimental site at the Disposal Plant for Mr. Gehring to continue his research.

3. Approximately July 15th 1967 the decision was made to design a scaled pilot test plant (at the expense of Mr. Gehring) capable of treating 70,000 to 80,000 gallons of raw sewage per every 24 hours. The assembly of the pilot plant dialysis section was completed over Labor Day weekend. With the use of substandard component parts, namely; air filtration and primary sections, the first test operation started at 2 P.M., September 6, 1967. The results proved promising and, in reality, astounding. Scores of area residents, representative of major industrial companies and city officials from the area witnessed bacteria-free water as the end product, after raw sewage was *

TELEPHONE 391 - 1127 • P. O. BOX 8276 • MADEIRA BEACH, FLORIDA 33738

Mayor and Members of the City Commission
City of Madeira Beach, Florida

October 19, 1967

run through Gehring's plant.

4. During the next month, adjustments and improvements were made to the dialysis unit and control instruments were added to increase efficiency. Consistent testing revealed progress was being made.

5. On October 16th, 1967, State and County Health Department Officials, the Federal Government Air & Water Pollution Control Assistant Commissioner, the Department of Interior Senior Regional Research Sanitary Engineer on Air & Water Pollution, the Executive Director of Tampa Bay Regional Planning Council, Sanitary Engineers, representing industry and professional engineering firms plus many other individuals, including the Mayor and Commission of the City of Madeira Beach inspected this experimental plant.

The Purpose of the official inspection was to determine whether or not this experimental sewage treatment pilot plant could meet the rigid requirements for a research development and demonstration Federal grant.

6. Independently, these health department officials conferred with Mr. Gehring, the City Manager and subsequently conferred with the Mayor and Members of the Madeira Beach City Commission regarding their impressions and beliefs as a result of their first-hand on the site inspection tour of the dialysis section of the experimental pilot plant. The discussion brought into sharp focus two missing requirements before serious consideration could be given by the Federal Government in awarding a research, development and demonstration grant to the City of Madeira Beach:

First: The project must officially be sponsored by the City of Madeira Beach.

Second: The request must be cleared through the Florida State Board of Health and this necessitates action by the City Commission before the State Board of Health will clear the project for consideration by Federal Agency.

7. IN CONCLUSION the City Manager requests that the Commission receive this report and further instruct the City Attorney to confer with Mr. Gehring and the City Manager for the purpose of preparing an appropriate resolution to be presented to the Commission for consideration at its next regular meeting November 9, 1967.

Believe me,

Always sincere,

Respectfully,

Stephen A. Derry

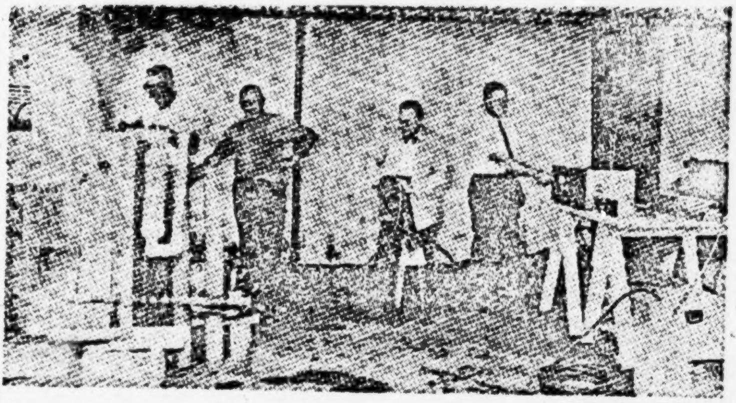
STEPHEN ARTHUR DERRY, P.E.
City Manager

SAD:jvj

201f

Process On Trial

ERIC McFAIL
Independent Reporter



Staff Photo by Eric McFail

The first model plant to treat raw sewage by electrodialysis goes into operation this week on an experimental basis in Madeira Beach. Looking over the first two stages of the apparatus are, from left, Mike Adiconis, superintendent of the Madeira Beach treatment plant; Newton Gehring, inventor of the dialysis unit; City Manager Stephen Derry and Gorden E. Ries, developer of the final electronic purifier for the facility. Equipment at the left is a separation unit which produces clear water. Where the men are standing will go the dialyzers with Ries' purifier units at right.

A process which could revolutionize modern sewage treatment goes into operation on a limited experimental basis this week in Madeira Beach.

Electro-dialysis of sewage, according to its inventor Newton Gehring, isn't exactly new but the form in which he intends to use it is new.

Madeira Beach, through city manager Stephen A. Derry, has agreed to let Gehring and his partner, Gordon E. Ries, set up a test installation to treat bad segments of the sewage coming into the main treatment plant.

The city is now in the throes of a sewage problem which, within a matter of months, is going to cost contributors to the sewage treatment more than $1-million if the old tried and true treatment methods are followed.

The new process, already proven successful on a small experimental scale, would knock off 60-80 per cent of the cost, be more trouble free and eliminate pollution from the products of the standard treatment facility.

"Sure, it sounds fantastic," Derry said yesterday as a crew started setting up the apparatus for the eight-week test. "I thought so too until I actually saw the process work."

Basically, the electrodialysis process is this:

Sewage is pumped into a series of dialysis chambers where it is charged electrically, separates all solids from the liquid. All bacteria are killed and the sewage has changed form into a liquid.

This liquid is then put into a separator tank which, by use of a newly developed but as yet unpatented permeable membrane, the solids are completely oxidized and the resultant fluid, bacteria free, is pumped to an electronic purifier which uses new methods of ozone treatment to kill off 100 per cent of the bacteria and leaves pure water as the end product.

"The dialysis treatment process," said Derry, an engineer in his own right, "completely oxydizes the organic compounds. If this large-scale test is successful, it will be the first successful method that attacks the nitrogen cycle in such a manner that the process is stabilized."

The process is odor-free.

Normal sewage treatment, according to leading engineers, retards the nitrogen c[illegible] but doesn't completely st[illegible]

Standard sewage treatment, Derry said, hasn't changed in anything except quality since the first plant was built more than 100 years ago in Hamburg, Germany. It's been all chemical.

All that can be accomplished by present methods is an adequate removal of objectional solids from the waste liquid.

"From what I've seen, this process, if nothing else, cuts treatment time considerably," Derry said.

In standard treatment sewage first sits for two to three hours at primary sedimentation chambers, is then retained in a digester to get rid of more solid material, put into aeration tanks and thence into final sedimentation.

After sedimentation, the liquid wastes are heavily chlorinated and discharged into a body of water and the solid, disposed of separately.

"These solids, however, contain odor, dormant aerobic, anaerobic and facultative bacteria which may come back into action," Derry said.

In contrast, the electrodialysis process completely oxidizes the solid material removed, thereby removing any possibility of harmful bacteria lying dormant, he said.

Advantages to the dialysis-purification system, its inventors say, include these:

— The cost of a facility to act on dialysis is about 30-50 per cent of a standard plant.

— The end products are pure water, not polluted water, and the sludge residue which is odorless, tasteless and free from contamination.

— Possible uses of gases and elements freed by dialysis include marketable chlorine, muriatic acid, hydrogen gas and the residue itself which, having a high lime content, can have any number of practical applications.

— By operation of a dialysis-purfication system, more than 75 per cent of the equipment normally found in a sewage treatment facility can be eliminated. This would save on initial plant expense, maintenance and replacement.

"I'm going out on a limb on this one," said the candid Derry. "It isn't costing the city anything to have these tests made, the inventors have waived insurance claims if any and have taken all steps to assure safe operation.

"If successful, Madeira Beach may have the chance to be the first community anywhere to have greatly reduced sewage treatment costs, more effective than present treatment and still have possibilities for marketing of useful chemical products for profit to further offset the already lowered cost of construction and operation."

The dialysis unit — or at least a prototype at Gehring's laboratory — apparently works. The liquid taken from the final stage of operation far exceeded all known requirements for purity, contained large amounts of chlorine which could be extracted and either disposed of or packaged and marketed.

Derry, fairly new at his job as manager of Madeira Beach, admits his neck is out on the experiment.

"I'm convinced, however, that it will work," he said.

Also sold, at least on the test model, is Mike Adiconis, superintendent of the Madeira Beach facility.

"From all the tests run on the final products — and I've made them myself — the operation works," he said. "We as well as treatment people in other areas are watching very carefully because if everything goes as it should, we'll have the biggest breakthrough in history of modern sewage treatment."

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